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THE JOURNAL

OF THE

ROYAL ANTHROPOLOGICAL INSTITUTE

OF

GREAT BRITAIN AND IRELAND.



VOL. LIV.

PUBLISHED BY THE

Royal Anthropological Institute of Great Britain and Ireland.

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NOTICE.

For convenience of reference, all volumes of the new (imperial octavo) series which began in 1898 are numbered in continuation of the old demy octavo series, Vols. I-XXVII. Thus Vol. I of the imperial octavo series=Vol. XXVIII of the old series : and the present Vol. LIV corresponds to N.S. Vol. XXVII.

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SELIGMAN, Prof. C. G., M.D., F.R.S. Anthropology and Psychology. A Study
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JOURNAL

OF THE

ROYAL ANTHROPOLOGICAL INSTITUTE

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MINUTES OF THE ANNUAL GENERAL MEETING,

TUESDAY, JANUARY 22ND, 1924.

Prof. C. G. SELIGMAN, F.R.S., *President, in the Chair.*

The Minutes of the last Annual General Meeting were read and accepted.

The PRESIDENT appointed Mr. W. ARMSTRONG and Mr. LOUIS CLARKE as Scrutineers, and declared the ballot open.

The HON. SECRETARY read the Report of the Council for 1923, which was accepted.

The HON. TREASURER read the Financial Report for 1923, which was also accepted.

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The PRESIDENT then read his address on "Anthropology and Psychology: A Study of some Points of Contact," illustrated by lantern slides.

The SCRUTINEERS delivered their Report, and the following were declared duly elected as Officers and Council for 1924-25 :—

President.—Prof. C. G. Seligman, M.D., F.R.S.

Vice-Presidents.

Capt. T. A. Joyce, M.A., O.B.E.

Prof. J. L. Myres, M.A., F.S.A., F.R.G.S.

H. J. E. Peake.

Hon. Secretary.—E. N. Fallaize, B.A.

Hon. Treasurer.—F. C. Shrubsall, M.A., M.D.

Hon. Editor.—H. S. Harrison, D.Sc.

Council.

C. O. Blagden, M.A.

M. C. Burkitt, M.A.

L. H. Dudley Buxton, M.A.

Miss M. E. Durham.

R. J. Gladstone, M.D.

W. L. Hildburgh, M.A., Ph.D., F.S.A.

Capt. M. W. Hilton-Simpson, F.R.G.S.

C. W. Hobley, C.M.G.

R. R. Marett, M.A., D.Sc.

J. Reid Moir.

Percy Newberry, M.A., O.B.E.

Prof. F. G. Parsons, F.R.C.S.

Prof. Sir W. Flinders Petrie, D.C.L.,
LL.D., F.R.S., F.B.A.

S. H. Ray, M.A.

Prof. R. W. Reid, M.D.

Charles Singer, M.D., F.R.C.P.

W. W. Skeat, M.A.

E. Torday.

S. Hazzledine Warren, F.G.S.

R. W. Williamson, M.Sc.

A hearty vote of thanks to the PRESIDENT for his address was proposed by Prof. PARSONS, who asked in the name of the Institute that the PRESIDENT would allow it to be published in the Institute's *Journal*. This was seconded by Capt. T. A. JOYCE and carried unanimously.

The Institute then adjourned.

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REPORT OF THE COUNCIL FOR THE YEAR 1923.

IN presenting its Report for the year 1923, the Council would wish to call attention to the fact that it has felt justified by financial and other considerations in making tentative movements towards the resumption of the full activities of the Institute on the scale on which they were conducted before the war. In particular a certain amount has been expended in the purchase of books for the Library, and the *Journal* has been enlarged so that it has now very nearly attained its normal size.

MEMBERS.

There has been a satisfactory addition to the number of Fellows during the year. The net increase in Members however is not great owing to the large number of losses by death. The figures are as follows :—

—	Total Jan. 1st, 1923.	Loss by death or resignation.	Since elected.	Total Jan. 1st, 1924.
Honorary Fellows	37	—	2	39
Local Correspondents	21	1	4	24
<i>Deduct Ordinary Fellows</i>	3	—	—	3
Affiliated Societies	18 4	—	—	21 4
Ordinary Fellows :—				
Compounding	53	5	3	51
Subscribing	483	40	44	487
	595	46	53	602

The Council regrets to record the death of the following Fellows in the course of the year :—

Deaths.—E. C. R. Armstrong (elected 1908, Obituary notice, *Man*, xxiii, 42); M. W. H. Beech (elected 1910); Miss A. C. Breton (elected 1900, Obituary notice, *Man*, xxiii, 76); Dr. Crochley Clapham (elected 1877); J. F. Collingwood (elected 1863); Dr. W. Crooke (elected 1892, Hon. Sec. 1899, Obituary notice, *Man*, xxiv, 5); T. V. Holmes (elected 1881); Sir H. H. Howorth (elected 1896, Obituary notice, *Man*, xxiii, 84); Mrs. Constance Jenkinson (elected 1918); Dr. A. B. Messer (elected 1877); V. Graham Milward (elected 1916); E. K. Muspratt (elected 1875); E. Westlake (elected 1911); S. Waddington (elected 1901).

PUBLICATIONS.

Two parts of the *Journal* have been published during the year, vol. lii, Part 2. vol. liii, Part 1. The sales to date amount to 115 for the former and 121 for the latter, as against 105 and 120 respectively of the two parts published in the preceding year. Twelve monthly parts of *Man* have appeared, the amount realized from subscriptions and sales being £240 17s. 5d., as against £241 11s. 6d. in 1922.

At the request of the Colonial Office, the Institute will issue as a separate publication a paper on "The Tribal Markings and Marks of Adornment of the Natives of the Northern Territories of the Gold Coast Colony." by Captain C. H. Armitage, C.M.G., D.S.O.

The Council was approached by the Percy Sladen Trustees with a proposal that it should publish a paper on "Stone Circles in Gambia," by the late Mr. Henry Parker. The paper appeared in the *Journal*, vol. liii, Part 1, part of the cost being borne by the Sladen Trustees. The Council has also to tender its thanks to the Royal Society for financial assistance towards the publication of Mr. L. H. Dudley Buxton's paper on the "Ethnology of Malta and Gozo" (*Journal*, vol. lii).

The Council has undertaken the publication, as an Occasional Paper, of a thesis by Mr. H. Frankfort, on "Early Pottery of the Near East." Part of the expense will be borne by the author, and the paper, which is a valuable contribution to the study of archæology of the Near and Middle East, will appear in the spring.

LIBRARY.

The additions to the Library comprise 261 items, of which 157 are bound volumes. A number of periodicals have been added to the publications received in exchange for the publications of the Institute. Under the will of the late Sir Henry Howorth, thirty volumes from his library are to be presented to the Institute.

The Council has again had under consideration the question of the Library. It is hoped to improve the shelving and arrangement of the books, and to make the collections of lantern slides and photographs more readily accessible at an early date. Donations towards the cost of this have already been promised, and an appeal to Fellows for additional funds will be issued shortly.

MEETINGS.

Nineteen Ordinary Meetings have been held, as against 14 (13 Ordinary and 1 Special) in the preceding year. The Council regret to record that Dr. E. S. Hartland, to whom the Council has awarded the Huxley Medal for 1923, was not able to prepare and deliver the Huxley Memorial Lecture owing to the state of his health.

RESEARCH COMMITTEES.

A report on the work of the Derbyshire Caves Committee appeared in the recently issued part of the *Journal*, and a second is now in the press. The work of this Committee has hitherto been hampered through lack of funds ; but donations from various sources will enable it to undertake operations on an extended scale in the coming year.

LOCAL BRANCHES OF THE INSTITUTE.

No further branches have as yet been established, though the question is under consideration in two or three areas. The Edinburgh and Lothians Branch has been very fairly successful in its first session, and through it several new Fellows have been added to the Institute.

BRITISH EMPIRE EXHIBITION.

It is to be regretted that those who are responsible for the organization of the British Empire Exhibition have found themselves unable to carry out the arrangements proposed for an anthropological exhibit.

RIVERS MEMORIAL.

A small Organizing Committee, representative of the medical profession, St. John's College, Cambridge, the Royal Anthropological Institute, the British Psychological Society, and other Societies with which the late Dr. Rivers was connected, was formed early in the year, and an appeal for a Memorial Fund was issued to the scientific public and to others through various channels. No official report of the response to the appeal has yet been published, as the list of subscribers is not closed. When it is decided to close the list, a meeting of the subscribers will be summoned in order to determine the form which the Memorial shall take.

CENTRAL BUREAU FOR ANTHROPOLOGY.

As foreshadowed in the last Report, the suggestion that the Institute should undertake the functions of the proposed Central Bureau of Anthropology was laid in due course before the Council by the Council of the British Association for the Advancement of Science, in accordance with the resolutions of the Conference of Representatives of the Universities and other bodies interested. A full report of the correspondence and resolutions will be found in *Man*, 1923, 70. In reply, the Council of the Institute signified its willingness to undertake the functions of a Central Bureau so far as its present resources would allow. It is hoped, however, that additional support may be forthcoming in the near future which will make possible a more adequate performance of the duties of such a Bureau. As a first

step in this direction, the Council has appointed a Permanent Committee to consider questions relating to anthropological teaching and research, to which the Universities and other teaching bodies, as well as certain learned societies, have been invited to send delegates. As the Institute is not a teaching body, the object of the Committee will be solely to provide a meeting place for discussion among those who are engaged in teaching and research, and, under the direction of the Council, to take such steps, by the collection of information or otherwise, as may facilitate this object. The first meeting of the Committee was held on May 29th, when twenty-two members were present, Sir Hercules Read being in the Chair. Several questions were discussed, and it was resolved that as a preliminary measure information should be collected respecting the facilities available for the teaching of anthropology in Great Britain. Professor J. L. Myres was requested to prepare a report on this subject. This report has now been printed through a committee of the British Association, and copies will be circulated among the members of the Committee before the next meeting.

HOUSING FUND.

The response to the appeal towards the formation of a Housing Fund, which was issued nearly three years ago, has been disappointing. The Council has, however, thought it advisable to delay following up the appeal until it had some concrete proposal to submit to Fellows. In the meantime, as a step towards facilitating joint action, it has made an offer to the British Psychological Society, which at present has no office and library of its own, of accommodation in the Institute's rooms, which will admit of the display of its exchange publications in the Library, and the storage of back numbers and a certain number of library books. The question of further facilities is under consideration.

INTERNATIONAL CONGRESS OF AMERICANISTS.

The Institute has been invited to take part in the International Congress of Americanists at Göteborg and the Hague in August next, and has appointed Dr. P. A. Maudslay, Mr. T. A. Joyce, and Mr. Louis Clarke to act as its representatives.

MEDAL FOR ANTHROPOLOGICAL WORK IN THE FIELD.

The Council has decided to found a Medal to be awarded for specially meritorious work in anthropology in the field, not more than two Medals being awarded in one year. In making the award preference will be given to Fellows of the Institute and others who are British subjects. It has been resolved further that this Medal shall be known as the Rivers Memorial Medal in memory of our late President.

Questions of cost and design are now under consideration, and it is hoped that it may be possible to make the first award within the current year.

TREASURER'S REPORT FOR THE YEAR 1923.

The financial position of the Institute may be regarded as satisfactory, considering that the year began with a credit balance of £130 and ends with one of £420. An increased revenue has been obtained from current subscriptions and from the payment of arrears, while rather less has come from advance payments and from compositions for life fellowships. It might be well in this connection to recall the fact that the subscription to the Institute was not raised during the period of the war, as there seems to be some misapprehension with regard to this matter.

The income from investments has slightly increased, in spite of the reduced payments on the "dollar bonds" in consequence of the exchange having moved in favour of Britain in the early part of the year.

There has been practically no change in the nett cost of the *Journal* and *Man*; both have had slightly smaller sales, but the cost of production has fallen in about the same proportion. A considerable part of the cost is due to exchange copies, but the journals received therefor form one of the most important features of the Library and are of great assistance to Fellows.

It would be wise not too hastily to assume that any particular service of the Institute could be materially extended on the strength of the present balance, since the Council have proposed certain commitments for the next year:—The Medal for field research, to commemorate our late President, Dr. Rivers; an increase in the next numbers of the *Journal*; a resumption of occasional publications; and subscription to certain publications on branches of the subject in which the Library is somewhat weak. These will use up a large part of the apparent surplus, though they may well add to the usefulness of the Institute, and so indirectly fill its most pressing need—an increased number of Fellows. Could this end be obtained, the amenities and facilities the Institute affords might be augmented materially.

F. C. SHRUBSALL,
Hon. Treasurer.

ROYAL ANTHROPOLOGICAL INSTITUTE

ACCOUNTS FOR

		REVENUE	
PAYMENTS.		£ s. d.	£ s. d.
RENT, HOUSEKEEPING. &c.	242 17 0		
<i>Less</i> Rent of small room	36 0 0		
			206 17 0
"JOURNAL"	585 8 1		
<i>Less</i> contribution to cost of blocks and tables	33 2 1		
			552 6 0
"MAN"			406 17 2
SALARIES			202 2 10
ADVERTISING			9 4 0
STAMPS AND PARCELS			92 19 0
TELEPHONES AND TELEGRAMS.....			12 16 10
PRINTING AND STATIONERY			37 17 7
COAL, GAS, AND LIGHT			12 16 7
EPIDIASCOPE			6 9 6
INSURANCE—			
Fire	5 0 0		
Other	4 16 7		
			9 16 7
SUBSCRIPTIONS TO OTHER SOCIETIES, DIRECTORIES, ETC.			8 7 8
BANK CHARGES AND COMMISSION			1 13 4
SUNDRIES			14 0 2
"HUXLEY LECTURE" ..			11 2 0
TYPEWRITER			1 11 3
COST OF INSCRIBING NAME ON BENEFACTORS' BOARD			0 11 0
TRAVELLING			1 13 0
AUDITORS' FEE			3 3 0
LONDON ASSOCIATION FOR THE PROTECTION OF TRADE.....			2 2 0
LEGAL EXPENSES			0 4 1
SUBSIDY TO EDINBURGH BRANCH			3 15 0
TRANSFER TO LIBRARY ACCOUNT			37 3 0
Balance carried forward, 31st December, 1923			642 18 5
			<u>£2,278 7 0</u>

OF GREAT BRITAIN AND IRELAND.

THE YEAR 1923.

ACCOUNT.

	RECEIPTS.	£	s.	d.	£	s.	d.
BALANCE BROUGHT FORWARD, 1ST JANUARY, 1923					357	3	4
SUBSCRIPTIONS :—							
Current	962	1	2				
Arrears	44	10	6				
Advance	23	2	0				
Life	63	0	0				
					1,092	13	8
ENTRANCE FEES					47	5	0
SALE OF "JOURNAL"	242	8	8				
Less Refunds	1	5	6				
					241	3	2
SALE OF "MAN"	384	15	11				
Less Refunds	3	8	0				
					381	7	11
SALE OF "HUXLEY LECTURE"					1	4	5
ADVERTISING					13	8	9
DIVIDENDS AND INTEREST	107	18	5				
,, (AMERICAN DOLLAR BONDS)	34	12	4				
					142	10	9
USE OF ADDRESSOGRAPH					1	10	0

£2,278 7 0

ACCOUNTS FOR

CAPITAL

	£	s.	d.
BALANCE CARRIED FORWARD, 31ST DECEMBER, 1923	5,461	3	2

£5,461 3 2

LIBRARY

	£	s.	d.
BOOKS AND BINDING	39	3	0

£39 3 0

HOUSING

	£	s.	d.
BALANCE, 1923	131	13	1

£131 13 1

ANTHROPOMETRIC

	£	s.	d.
BALANCE, 1922	15	15	6
PURCHASE OF INSTRUMENTS	20	13	0

£36 8 6

THE YEAR 1923—continued.

ACCOUNT.

	£	s.	d.	£	s.	d.
BALANCE BROUGHT FORWARD, 1ST JANUARY, 1923.....				5,437	0	1
INCREASE IN VALUE OF £886 BURMA RAILWAY STOCK:—						
Valued 31st December, 1922 at 101½	899	5	9			
Valued 31st December, 1923 at 104	921	8	10			
				22	3	1
SUBSCRIPTIONS IN ARREAR:—						
Estimated Value 31st December, 1922	42	0	0			
Estimated Value 31st December, 1923	44	0	0			
				2	0	0
				£5,461	3	2

ACCOUNT.

	£	s.	d.
TRANSFER FROM SPECIAL ITEMS ACCOUNT—SALE OF BOOKS	2	0	0
TRANSFER FROM REVENUE ACCOUNT	37	3	0
	£39	3	0

FUND ACCOUNT.

	£	s.	d.
BALANCE, 1922	126	2	9
DONATIONS AND INTEREST	5	10	4
	£131	13	1

INSTRUMENT ACCOUNT.

	£	s.	d.
SALE OF INSTRUMENTS	18	15	6
BALANCE, 31ST DECEMBER, 1923	17	13	0
	£36	8	6

BALANCE SHEET.

	£	s.	d.	£	s.	d.	£	s.	d.
Amount due for Anthropological Notes and Queries on 1st January, 1923	61	9	0				3,493	6	0
Further sum received during the year	9	0	10				200	0	0
				70	9	10	921	8	10
Balance of previous Accounts:—							279	0	0
Revenue Account	642	18	5				147	10	0
Housing Fund Account	131	13	1						
Capital Account	5,461	3	2				500	0	0
	6,235	14	8				44	0	0
Less Anthropometric Instrument Account	17	13	0						
				6,218	1	8			
							88	11	5
							1	11	6
							86	19	11
							234	13	8
							250	0	0
							131	13	1
							616	6	9
							£6,288	11	6

We have examined the Accounts of the Royal Anthropological Institute and have obtained all the information and explanations we have required. In our opinion the Balance Sheet at 31st December, 1923, is properly drawn up so as to exhibit a true and correct view of the state of the Institute's affairs according to the best of our information and as shown by the books of the Institute.

58, Coleman Street, London, E.C.2.

18th January, 1924.

JACKSON, PIXLEY & Co.,

CHARTERED ACCOUNTANTS,

Auditors.

PRESIDENTIAL ADDRESS.

ANTHROPOLOGY AND PSYCHOLOGY: A STUDY OF SOME POINTS OF CONTACT.

[WITH PLATES I—IV.]

By PROFESSOR C. G. SELIGMAN, M.D., F.R.S.

	PAGE		PAGE
The Extravert and Introvert Types ...	14	The Dreams of Non-European Races...	35
The Types in Art	17	Type Dreams	41
Some Biological Aspects	23	Conclusions	46
The Types among Savages	26	List of Plates	46
The Types among Civilized Peoples ...	28		

IN selecting the subject of this address I hesitated whether to discuss with you some of the problems raised by the results obtained by Mrs. Seligman and myself during our sojourn in 1921–22 in an anthropologically unexplored area to the east of the White Nile, or whether to attempt to investigate a portion of that little-known borderland where social anthropology, psychology and genetics meet in common biological kinship. I have chosen the latter alternative as of more immediate interest, and the tracks I propose to follow are those suggested by the work of Jung and Freud, the two psychologists who have most strongly influenced modern thought. I shall first suggest to you some possible developments of anthropological interest based upon the views put forward by Jung concerning the importance of the two “types” which he calls extravert and introvert, and I shall then outline what I have been able to discover of the dreams of non-European races, a subject which intermittently has occupied my attention for the last three years.

It is not an accident that these two subjects are concerned largely with the unconscious, though until writing this paper I did not realize how preponderantly this was the case. I take it rather to imply that any comparative studies of character, using the word in its broadest sense, will of necessity start from or lead back to those deeper layers of neurotic organization of whose action we are normally unconscious or only partly conscious.

Before going further I would claim your indulgence on the score of ill-health for a certain sketchiness and rather incomplete documentation. I was not aware

when writing that Professor McDougall had considered some of the matters here discussed in the fifth chapter of his *National Welfare and National Decay*, nor had I then seen H. F. K. Gunther's recent work on the German people, *Rassenkunde des deutschen Volkes* (Munich, 1923). In preparing for press I have made some slight use of these works, but not as much as I could wish. I may, however, point out that generally where the same problems have been discussed there appears to be a considerable measure of agreement. I am greatly indebted to a number of friends for the assistance they have given. Foremost among these I would place Mr. Alfred Thornton, without whose aid part of this address could not have been written, while I am scarcely less indebted to Messrs. J. H. Hutton, C.M.G., J. P. Mills, and R. S. Rattray for their invaluable records of the dreams of the native peoples they know so well. My thanks are also due to Dr. Ronald Gordon for permission to quote from an unpublished work, to M. Paul Guillaume, of Paris, for allowing me to publish the two photographs of objects in his possession reproduced on Pl. IV, and to Drs. Roheim, Christian, and Hildburgh for a number of references.

THE EXTRAVERT AND INTROVERT TYPES.

It has long seemed to me that one of the characters of those of the more primitive peoples of whom I have had personal experience, Africans, Melanesians, Veddas and up-country Sinhalese, which seemed to differentiate them from ourselves was their greater suggestability (using the word in its psychological sense) and the ease with which they passed into conditions of dissociation. Superficially, then, in certain reactions they resembled hysterics, but it would hardly be convincing to bring forward the claim that the great majority of individuals among savage peoples were normally in the condition brought about among a minority of ourselves by conditions of stress and conflict. However, there was the resemblance, and every time I went among savages I became more convinced of the fact. The clue, I would suggest, lies in the discovery by Jung that among ourselves there are two fundamentally opposed "types" or dispositions (the word is my own), the extravert and introvert. Jung reached this conception by a consideration of the striking contrast in their reactions to the external world, presented respectively by sufferers from two diseases, hysteria and dementia præcox.

"The existence of two mental affections so opposite in character as hysteria and dementia præcox, in which the contrast rests on the almost exclusive supremacy of extraversion or introversion, suggests that these two psychological types may exist equally well in normal persons, who may be characterized by the relative predominance of one or other of the two mechanisms. Psychiatrists know very well that before either illness is fully declared, patients already present the characteristic type, traces of which are to be found from the earliest years of life . . .

the neurotic only accentuates and shows in relief the characteristic traits of his personality . . . the hysterical character is not simply the product of the illness, but pre-existed it in a measure. And [it has been shown for] dementia præcox patients that this is also the case . . . dissociations or eccentricities were present before the onset of the illness. If this is so, one may certainly expect to meet the same contrast between psychological temperaments outside the sphere of pathology. It is, moreover, easy to cull from literature numerous examples which bear witness to the actual existence of these two opposite types of mentality."¹

I have spoken of Jung as the discoverer of the two types, since he was the first to systematize their differences, to show their significance in pathology, and to indicate the part they play in normal life. But years before this the soundest of observations upon the two types had been made by Henry James, who divided philosophers into two classes—the "tender-minded" [introvert], who are only interested in the inner life and spiritual things, and the "tough-minded" [extravert], who lay most stress on material things and objective reality.

"James says that the tender-minded are characterized by rationalism; they are men of principles and of systems, they aspire to dominate experience and to transcend it by abstract reasoning, by their logical deductions and purely rational conceptions. They care little for facts, and the multiplicity of phenomena hardly embarrasses them at all: they forcibly fit data into their ideal constructions, and reduce everything to their *à priori* premises. This was the method of Hegel in settling beforehand the number of the planets. In the domain of mental pathology we again meet this kind of philosopher in paranoics, who, without being disquieted by the flat contradictions presented by experience, impose their delirious conceptions on the universe, and find means of interpreting everything and, according to Adler, 'arranging' everything, in conformity with their morbidly preconceived system."²

The other traits which James depicts in this type follow naturally from its fundamental character. The libido is concentrated almost exclusively upon the intellectual life, and this concentration upon the inner world of thought is nothing else than introversion.

"The tough-minded man is positivist and empiricist. *He regards only matters of fact. Experience is his master, his exclusive guide and inspiration. It is only empirical phenomena demonstrable in the outside world which count. Thought is merely a reaction to external experience.* In the eyes of these philosophers principles are never of such value as facts: *they can only reflect and describe the sequence of phenomena and cannot construct a system.* Thus their theories are exposed to

¹ Jung, C. G., *Analytical Psychology* (1917), pp. 289, 290.

² Jung, C. G., *op. cit.*, p. 290.

contradiction under the overwhelming accumulation of empirical material. *Psychic reality . . . limits itself to the observation and experience of pleasure and pain*; he [the positivist] does not go beyond that, nor does he recognize the rights of philosophical thought."¹

But in spite of the reality of the two types and the ease with which their extreme examples are recognized, it must be admitted that it is not easy to express in any general formula their contrasting reactions to the object.² These can, in fact, be best understood by considering a concrete instance, and I am indebted to Dr. Ronald Gordon for permission to take the following example from his forthcoming volume on personality. Dr. Gordon imagines the observer hit by a falling rock which breaks his arm. The injured man first describes the reactions of an extravert onlooker. Dr. Gordon's description may, I think, be paraphrased as essentially those of the practical surgeon—prompt help, rapid diagnosis and immediate helpful treatment, the obvious features of the situation being rapidly taken in and correctly handled. The attitude of the introvert is next considered. "This is more difficult to describe because our language does not lend itself so easily to this type of thought. The introvert attitude is not readily appreciated or exhibited by the Anglo-Saxon or, indeed, by Western men at all, for introjection is much more general in the Oriental. Such an observer would tend to identify himself with the situation as subject . . . he would be interested in how I [of the broken arm] as a subject reacted to the event . . . he would not necessarily conclude that I suffered pain and that my arm was broken because, as the extravert knew, it was perfectly obvious that it was, but might consider the possibility that I had an anæsthetic arm and so had not any pain, and that the cry was evoked by the noise of the stone falling. He might weigh the possibility that my arm fell to my side, not because it was broken, but only because it was bruised: he would be less interested in the facts than in the possible explanation, though he might, and probably would, come to the same conclusion as the extravert, but would only arrive at it after considering and rejecting other possibilities. Similarly, if he considered the stone as subject he would identify himself so far as possible with it, and be interested less in the fact that it fell than in the laws that determined its fall."

¹ Jung, C. G., *op. cit.*, p. 291. The italics are my own: their purpose is made clear on p. 26.

² Even Jung fully realizes this, cf. *Psychological Types* (1923), pp. 12-14. Moreover, he points out that this grouping must be extended, or rather that within each group categories arise according to "the predominance of one basic function in the individual." As basic functions there exist "thinking, feeling, sensation and intuition. If one of these functions habitually prevails a corresponding type results. I therefore discriminate thinking, feeling, sensation and intuitive types. *Every one of these types can, moreover, be introverted or extraverted* according to his relation to the object in the way described above."

In his earlier communications concerning psychological types, Jung did not distinguish the four types outlined above, but identified the thinking type with the introvert type and the feeling type with the extravert. This is the division I have accepted in this paper.

The existence of the two dispositions ("types") being admitted, and it seems to me that as to this there can be no doubt (though naturally most of us are not extremes of either type, to be classified at sight), it becomes not only interesting but anthropologically important to push our inquiry into their biology, to consider their racial as well as their intra-racial distribution, to seek their modes of inheritance, how far they are capable of being reinforced in the individual as the result of environment, and to inquire whether the two dispositions commonly exert a sexual attraction or repulsion upon each other, and whether the reactions characteristic of each are expressed by a particular *facies* in the concrete works of art and of the crafts they produce.

It is obviously impossible to attempt to give a reasoned and adequate answer to all these questions within the time allotted to my address, even if I had the knowledge. As it is, I propose to consider the less difficult of these questions first, namely, the character of the two types as exhibited in art, especially in painting, while I shall also discuss with you certain possibilities as to their heredity, for I hold that the two types or dispositions must be regarded as innate, so that in whatever direction they may be influenced by subsequent environment they are nevertheless present in the child at birth (and therefore in the fertilized ovum). The basic importance of the dispositions would, I think, suggest this *à priori*: it is at any rate the view that I shall hold in the remainder of this address.¹

THE TYPES IN ART.

As far as I am aware, the credit of discovery belongs to Mr. Alfred Thornton, who, with Dr. Ronald Gordon, first pointed out, as far as Europe is concerned, that the works of famous painters fall into two classes distinguishable at sight in the more pronounced instances, and that these classes each exhibit a characteristic *facies* corresponding to one of the two dispositions. It will, perhaps, simplify what follows if I immediately point out that, broadly speaking, that form of painting usually termed "Classical" is characteristic of introversion, while "Romantic" painting is of the extravert disposition.

The ideas of Thornton and Gordon, with much of the evidence upon which their conclusions are based, are set forth in a number of articles in *The Burlington Magazine*.² I am indebted to Mr. Thornton for the following summary:—

"The introvert painter emphasizes severity of form, and his painting is characterized by deliberate thinking, with suppression of the more emotional types of symbolism. His work is therefore carefully drawn, somewhat hard, severe in outline

¹ I may be allowed to anticipate and say that this is also the view taken by Dr. Jung (cf. *infra*, p. 23).

² Alfred Thornton and Ronald Gordon, "The Influence of certain Psychological Reactions in Painting," *Burlington Magazine*, May, 1920, and "Art in Relation to Life," *op. cit.*, July and August, 1921.

and inclined to be arid in colour : at best the colour schemes are restrained and relate very exactly to the design of the picture, but with little verve.

" On the other hand, when a painter is of the extravert type his colour is full and rich, often luscious, the form is not exact : but the lines are free and flowing and tend to exaggeration of movement, their dynamic quality being in strong contrast with the static tendency exhibited by the introvert's careful compositions. Extravert work, even if slowly produced, still gives the impression, in many cases, of having been executed in a white heat of passion, and the brushwork is vigorous, at times to the verge of brutality, differing vastly from the thin dry technique of much introvert painting. So it may be said that the general character of the type of work produced by the extravert betokens emotional emphasis, and is accompanied by apparent carelessness as to detail and absence of severity in form. Yet the great men of both types, being in a measure able to adapt, attain a relatively high standard even when their temperaments are not naturally suited to the selected subject."

Mr. Thornton goes on to illustrate his statements by "pairs" of painters working respectively in the 16th-17th centuries (Rubens and Poussin), the early 18th century (Delacroix and Ingres), and at the present day (Signac and Marchand). He has also selected for reproduction the paintings as far as possible of kindred subjects, reproduced in Pls. I to III.

Rubens (1577-1640), who may be taken as a typical extravert, is illustrated here by his *Danza Compestre*, which contrasts significantly with the *Bacchanal* by Poussin, both reproduced on Pl. I.

" Rubens was characterized by rapidity of creation and great powers of making use of every imaginable subject. As a man he was a *bon vivant* and lover of society and his style that of an eloquent narrator amused by his own talking, not much affected by difficulties, or really troubled to any profound extent or harassing himself with subtle research. He preferred luscious forms and rich colours, clarity and strength to depth and distinction. Sensual in temperament, his canvases show this, and they are not ennobled by high aspirations or implicit tendency. His nudes are brilliantly expressed and clear in form, but nothing in them brooded on or dreamt about. The rollicking sensuality and joy of the *Danza Compestre* tells its tale clearly enough and proclaims the artist to be a lover of health and healthy himself, a thorough extravert going joyously out on to life."

Contrast his work with that of Nicholas Poussin of the same period (1594-1665), who was a true introvert. " His painting at once proclaims itself the result of an emphasis on thought rather than emotion, on abstract ideas rather than on rapidly summarized actuality. His pictures are vigorous in conception and correctly drawn, but his nudes have nothing vibrant in their flesh. Of the many Bacchanals painted by him none ever seem to smile or show traces of real voluptuousness. His colour is too considered, though he finally attained a noble type of harmony that became satisfying through its complete accord with the nature of his designs rather than

by any intrinsic emotional element. Perhaps his landscapes are the most successful of his works from this particular standpoint, thanks to a discreet tonality. His attitude to life was thoroughly introvert and in marked contrast in its considered caution to Rubens' gay abandon. From his letters it appears that his ideal was to be intellectually free, always master of himself, allowing no fury of creation, and to treat nature as a language whereby the various human emotions could be expressed and communicated to the world. These and other objects were attained by the most careful and laborious research. He even studied the most minute details of contemporary archæological discovery for his pictures, leaving nothing to chance. His work was always deliberate (in entire contrast to Rubens, whose dozens of rapidly executed canvases reveal an enormous power of covering space, even after due allowance be made for collaboration). '*Mon naturel me contraint de chercher les choses bien ordonnées,*' says Poussin. His *Bacchanal* shows these characters in almost diagrammatic form as contrasted with Rubens' florid design in the *Danza Compestre*."

"Delacroix (1799-1863) may be regarded as leader of the Romantic School which, culminating in 1830, had arisen as a protest against the tyranny of Greece and Rome exercised over the French painters just preceding him. His admiration for Veronese and Rubens was unbounded, and he took his subjects from Dante, Shakespeare, Byron, etc. His drawing was characteristic of his type, being inexact, yet expressing the life and spirit of his *motif* with often feverish energy. The work exhibits bold technique and a full flow of paint as well as richness of colour. The sombre splendour of colour in the example given here, *Dante et Virgile* (Pl. II), is equalled by the violent gestures of the figures. A typical extravert, he was anathema to his great rival Ingres (1780-1867), who, standing in complete contrast to him, has left a wonderful series of drawings—chiefly portraits—unequalled in art for delicacy and exactness as well as subtlety and verve. The tactile values are as keenly felt as by any Florentine artist."

"But like his prototype Poussin, Ingres was incapable of expressing passion and emotion, as is well shown by his *Antiochus et Stratonice*, here reproduced (Pl. II). His colour-sense—the emotional element—was defective since his work is at once violent yet dull in colour. His feeling against the characteristics of extraversion in painting ran to bitter lengths, even to personal abuse. An introvert, he rather shunned society, whereas Delacroix sought it out, although his selection was carefully made."

The temperaments of the two men are well brought out by the self-portraits reproduced on Pl. III.

Of modern Frenchmen, Mr. Thornton suggests Paul Signac (extravert) and Jean Marchand (introvert). I have seen representations of the same scene—the harbour of La Rochelle—by the two men, and their difference in approach to the same subject is most instructive. Both artists are serious men and highly esteemed

in France and England, not merely on the ground of present work, but because of past achievement.

"To sum up: considering first the work of Rubens, Delacroix, and Signac, we see in all three painters a freedom of line and vitality of expression in form carried out at the expense of exactness. This type of artist emphasizes the emotional element in painting, and the colour harmonies chosen by these men correspond exactly to their mental tendencies. On the other hand, a short consideration of the work of Poussin, Ingres, and Marchand betrays a definite emphasis on the intellectual rather than emotional side of art. The whole of their compositions are definitely planned and nothing left to chance or happy incident which may come into being in the course of painting in the impetuous manner of extravert painters such as Rubens and Delacroix."

In any discussion of extravert and introvert tendencies in painting, consideration must be given to what seems to be a change of style, extravert to introvert or *vice versa* in the same area. Obviously racial displacements or new contacts might account for these, but it is certain that no such cause can be evoked to explain some of the more obvious instances. Presumably the change in style in painting so definite at certain epochs, as between Byzantine and early Renaissance in Italy, or, to come to our own times and country, between Victorian and Georgian, is to be correlated with a general change in outlook in life, but this is merely to re-state the problem in more general terms. Is it to be supposed that the proportion of extraverts to introverts varies in the same country from time to time and within a relatively short period? This is scarcely probable: it would seem rather that at particular times environment favours the expression of one temperament rather than the other, when the artistic output of that period will in the main be characteristic of the favoured type. This view differs from that put forward by Mr. Thornton, who in art, "as with all else," sees a "rhythm not merely in design, but in ebb and flow . . . perpetual action and reaction."¹ Nor can I agree with him when he writes of repression "of the opposite type . . . into the unconscious levels of the mind where it gradually accumulates, later on to manifest itself in place of its precursor at conscious level." This seems to imply a group mind, and the facts, as I understand them, seem to warrant the simpler explanation I have set forth: yet these are but theoretical considerations, we cannot doubt, *e.g.* that in the later Middle Ages it was the church and, above all, the monasteries, that offered a reasonably adequate refuge from the harshness of the world to so many of those who felt themselves disinclined or unfit to face the struggle without. Thus was the introvert provided for on a scale that has never happened again, and so we have left to us as the measure of the period much introvert art of the finest quality.

¹ I must again thank Mr. Thornton, this time for allowing me to use the MS. of an article "Modern Painting from a New Standpoint," the greater part of which appeared in *The New Age*, May 4th, 1922.

There is another point of view worth considering in connection with changes more quickly brought about and enduring for a shorter time than those longer periods of which Mr. Thornton writes. I have referred elsewhere to the part played by individual, unorthodox touches in feathers and paint in enhancing the self-regarding feelings of Melanesians and their purposive use in order to impress others, especially strangers.¹ This assertion of individualism—the desire to be different from others—in no way peculiar to savages, may well play a part in bringing about new developments of art (locally) without any very obvious change of environment. Impressionism which, as Mr. Thornton informs me, reached its apogee about 1893, probably had in it much of this feeling, at any rate in its early stages; “self-expression” and *épater les bourgeois* were, if I remember aright, very much in the air at that time, yet before the war this extremely extravert art had practically disappeared, to give place to the so-called post-impressionism, which in its varied forms is conceptual rather than perceptual and distinctly introvert, as is so much of the English art of the present day.²

The *differentia* observed in the painting of the two types among the white races have no direct bearing on the elementary drawings and paintings of savages, but if emphasis be laid on the generally perceptual type of extravert art as against the more conceptual character of introvert work, then just possibly sculpture may offer a point of contact. There does, at any rate, appear to be a more realistic or perceptual character in the majority of carvings, whether of figures or masks, of the West Coast of Africa than in those of, *e.g.* the Kasai (Central Africa), where both carvings in the round and masks are often less naturalistic and, as far as I may judge, seem rather to express an idea than an image. Yet judgment is made the more difficult by the general tendency of savage art to become conventionalized, as, for instance, the art of Polynesia. Here every stage of the human figure can be found from moderately conceptual carvings in the round to geometric designs, which only comparative study reveals as anthropomorphs.

Pl. IV illustrates two African masks and two carvings in the solid, which do seem to me to illustrate perceptual and conceptual characters respectively.

As to poetry, a recent anonymous article³ indicates that here, too, the two types exist.

“Poets and poetry are, and always have been, of two kinds. You may make the division on many lines, but the results will not be very different. On the one side there is revolution, on the other acceptance: on the one freedom and wilfulness,

¹ *Melanesians of British New Guinea*, p. 37; since then I have seen the same thing in the Southern Sudan: cf. also A. R. Brown, *The Andaman Islanders*, p. 122.

² I assume that the exhibition of War Pictures at Burlington House gave a fair indication of the tendency of present-day British art.

³ “Acceptance and Adventure,” *Times Literary Supplement*, vol. xxii, 1923, pp. 757, 758.

on the other art and labour and learning; on the one conservatism, tradition, sobriety, the quietness and confidence of ancient ways in thought and form and language, on the other the pleasures and dangers of originality and novelty, the confidence of youth, impatient at the lethargy of custom, eager to make all things new, and sure that making them new is the same thing as making them better . . .

"Yet, necessary as both aspects or qualities are, for poets as for men, it is plain enough that they are very unequally distributed. Poets have their natural temperaments, like other men, and that word covers all the varieties which lie between its opposite kinsfolk, temper and temperance. Anyhow, there the division lies—one sort on one side and one on the other: each, perhaps, partaking a little of the qualities of its opposite, but still being itself and not its opposite: letting the balance lean decidedly on the side of form and craftsmanship and tradition, and that temperance which for the Greeks was no negation, but an active and positive virtue; or, again, on the other side, the side of defiance and experiment, originality and rebellion. There they confront each other down the centuries. . . . Of course, the craftsmen have much more than craftsmanship, and the iconoclasts are not without form, or they would not be remembered at all. But there is a wall, however thin, between them, and neither the greatest nor the most cherished and read are all on one side of it."

I would suggest that Kipling, Swinburne, Whitman and Blake may be taken to represent the extravert disposition in varying degrees, Tennyson and Bridges the introvert.¹

Turning to science, the two types are at least as recognizable here as they are in the arts, though, owing to the relatively absolute standard demanded in the highest grades of research, it seems that it may be more difficult to place the worker in one category or the other, though the observer who sees the work going on should have little difficulty in forming an opinion. But on this matter I do not feel that I have anything fresh to say, and I can only refer to Jung's recent and admirable treatment of the subject.²

¹ The opposite "pairs" suggested by the writer of *The Times* article are Sophocles and Euripides, Horace and Lucretius, Pope and Blake, Tennyson and Browning, Heredia and Verlaine, Whittier and Whitman. No doubt he is right in his grouping. I have not included his list in my quotation simply because I am not sure whether his classification coincides absolutely with that into the two dispositions, and I have not sufficient knowledge of some of his poets to attempt to judge. It may be permissible to note here that the essay "On the terms 'Classical' and 'Romantic,'" in Sir Arthur Quiller Couch's *Studies in Literature*, interesting enough from one angle, is not likely to be of assistance to the psychologist. The reverse is true of Mr. Robert Graves' volume *On English Poetry*, which, in spite of bad terminology, I suppose to be the most important contribution in English to the study of the theory of poetry, yet he scarcely seems to realize the deep temperamental differences that lie behind the two forms of performance.

² *Psychological Types*, chapter ix, "The Type Problem in Biography."

SOME BIOLOGICAL ASPECTS.

The more directly biological questions I have mentioned on p. 17 are among the most difficult to answer, perhaps because there is no such readily accessible *corpus* of material to draw upon as in the case of painting and poetry, but certainly because the early or preliminary observations upon which our later investigations must be based can only be made on rather extreme examples, and naturally the number known to the individual sufficiently well is limited.

First, with regard to the frequency of the two types. It seems to me that the world, as I know it, contains more extraverts than introverts, but Dr. Jung is of the opinion that the numbers are approximately equal, and has pointed out to me that the seeming preponderance of extraverts may be due to the fact that they are as a rule more conspicuous. The following figures supplied by Dr. Jung he regards as bearing out his opinion, but making all allowances for the difficulty of classification and the comparatively small numbers concerned, it does seem that in both classes the extraverts preponderate to a significant degree. "Of 77 friends, relatives and acquaintances, 34 are introverts and 43 extraverts, while of 70 patients treated during the past year, 39 were extraverts, 25 introverts, the type of the remaining 6 failing to be determined."

With regard to heredity, Dr. Jung agrees that the condition is innate, informing me that in four out of five of his own children he made his diagnosis in the first month of life.

As to the mode of heredity, every one will agree that in even moderate-sized families both extraverts and introverts occur, but, as for the layman there is the ever-present difficulty of diagnosis, I may be allowed to quote examples given me by Dr. Jung:—

<i>Parents.</i>		<i>Children.</i>		<i>Parents.</i>		<i>Children.</i>
♂ intr.	}	I ♀ intr.		♂ extr.	{	I ♂ intr.
♀ extr.		II ♀ extr.				II ♂ extr.
♂ extr.	{	I ♂ extr.		♀ extr.		III ♀ extr.
♀ intr.		II ♀ intr.				IV ♂ extr.
		IV ♀ extr.				
♂ intr.	}	I ♂ intr.		♂ intr.	{	I ♀ intr.
♀ extr.		II ♀ extr.				II ♀ extr.
						III ♂ extr.
				♀ intr.		IV ♀ extr.
						V ♀ intr.

These examples, though few, indicate that children of both extravert and introvert dispositions may be born of parents with the opposite dispositions, as also from parents of the same dispositions, whether extravert or introvert. There is a further and, as it seems to me, most interesting aspect of heredity to be considered,

but before offering what little evidence I have on this matter there is a theoretical consideration to put before you. The great and essential differences between the two types must, I believe, be ultimately attributed to the central nervous system.¹ This is derived from that layer of the embryo termed epiblast, as is the skin with its appendages, the hair and nails. It will therefore be justifiable to suggest that children, the offspring of parents of differing dispositions, who also have distinct skin and hair colour,² showing alternate inheritance, *i.e.* resembling one of their dissimilar parents in skin and hair colour, may also resemble that parent in disposition. Personally I know one family sufficiently well to make it worth while to chronicle as much as I can bearing on the present discussion.

My own knowledge of the family, as far as can be ascertained of pure Jewish descent, begins with X, a red-haired, fresh-complexioned extravert with greyish-blue eyes, of optimistic temperament, full of energy and with enough business ability and practical common-sense to make a considerable fortune entirely by his own efforts. He married Y, a handsome woman with a fresh complexion, brown hair and dark eyes, her features being by no means typically Jewish. In temperament I judge her to tend to introversion, though she is certainly not an extreme type. A large family resulted from the marriage, among them being one male, H, and three girls, B, I and N, who all take after their father in colouring (skin and hair) and features. All these are extraverts, and at least three have more than average "brains," as was the case with their father.³ None of the family can be said to be strikingly like their mother. The majority are distinctly intermediate

¹ It is not denied that the internal secretions may exert a considerable influence on the psychical make-up of the individual, but pathology apart, I doubt whether such relatively small excess or diminution in the secretions of the ductless glands as not to influence the general health can determine the "type" of the individual, though it may well be that such minor deviations determine whether, within his type, he shall be a success or failure. It may, perhaps, prove more to the point to remember that besides the ductless glands the viscera are innervated by two anatomically distinct divisions of the vegetative nervous system, the sympathetic and autonomic (or vagotonic). Stimuli conveyed by the two systems are antagonistic, and it is their balance that regulates the action of the organs. It is stated for Europeans that two groups exist, distinguished by the predominance of sympathetic or autonomic habit. The former characterized by easy excitability, emotional outbreaks, a warm skin easily breaking into perspiration and a frequent pulse: the latter unemotional, slow-pulsed, with small pupils and a relatively cold skin. It remains for future investigation to decide to what extent (if any) these "habits" are to be correlated with race and "type."

² But not eye colour, since it seems that the wandering pigment cells which, at any rate, do much to determine the colour of the iris, are of mesodermic origin. In any event, anthropologists are generally agreed that, intra-racially, eye colour tends to vary more than hair colour, *i.e.* to be less definitely distributed than hair colour, cf. *e.g.* Ripley, *Races of Europe*, p. 64. On this point see also the discussion by Ruggles Gates in *Heredity and Eugenics* (1923), pp. 44 *seq.*, especially the tables on pp. 46 and 47, which bear out the statement that there are more brown-eyed women than men, a fact which has been explained as due to sex-linkage.

³ Shown in two subjects by their scientific work, and in the one by the high level of her work in one of the crafts.

types physically: of these A (♂), D (♀) and L (♀) are extraverts, M (♀) with much of her mother's features, but lighter colouring, probably introvert, while of the remaining children I scarcely have enough personal knowledge to express an opinion. But summing up, it may, I think, be safely said that, with the possible exception of A, there is not one so typically extravert as the four children first described who closely resemble their father in physical appearance.

Concerning the ancestry of X and his relatives of his own generation, his father when a boy ran away to sea and was present at Trafalgar. Later, having settled down, he never got on with his own people and in the world of affairs appears to have been entirely unsuccessful, though his father (X's grandfather) had a successful manufacturing business in the Midlands. For energy and perspicuity X stood head and shoulders above his brothers and sisters (seven), one of whom (♂) is reported to have had the same type of features as X.

I may also refer to another family, the head of which, V, is of Scottish ancestry, from the neighbourhood of Aberdeen, where his ascendants can be traced back to the early part of the 16th century. V's maternal grandfather was a Russian subject with a French name.

All V's immediate forbears for two generations, as well as a brother and sister, are, or were, blue-eyed: moreover, both his grandparents were fair-haired, as was his father, his mother's hair being almost black. He is blue-eyed with brown hair (as is his only brother), and is described by one of his most intimate friends as introvert: his mother, also blue-eyed and dark-haired, was extravert, more so than his father, who was blue-eyed and had fair hair. His wife, W, with brown hair and brown eyes, coming of a stock in which blue, hazel and brown eyes all occur, is described by the same friend as extravert: her father, with hazel eyes and dark hair (almost black), with sallow complexion, was an introvert: her mother, blue-eyed and fair, an extravert. V has two sons, A with blue eyes and fair hair, described as introvert, and B with dark hair and brown eyes, described as extravert. Facially and temperamentally (this does not explicitly refer to extraversion and introversion), V takes after his mother's family, while his twin sister takes after her father's family.

It is worth noting that in both V and his mother the upper outer permanent incisors are lacking: they are present in his twin sister and in his sons.

From the history of these two families it would seem that there is at least a suggestion that where there is alternate inheritance in physical characters, "type" may be correlated with these. If so, the matter is worthy of further investigation, even if it be early discovered that the correlation is not high. In this connection it may be worth recalling the popular ideas concerning chestnut horses and red-haired people, which link skin and hair colour with temperamental characteristics.

As to the question of sexual attraction between the two types, the XY and VW marriages supply examples, and while it is probably true that all three of the most extravert XY daughters married introverts, it is certainly so of the two most

strongly extravert. As I write this a fair number of extravert-introvert marriages come to mind, but again there is the difficulty of recognizing with certainty all but the more extreme examples. I may, however, note that my friend, Dr. T. S. Good, Superintendent of the Oxford County Mental Hospital, takes the view that these are by far the most common marriages in which pure attraction plays the dominant part. It will be noted, though the number is small, there is a slight preponderance of "mixed" marriages in the record on p. 23.

THE TYPES AMONG SAVAGES.

Having followed Jung in his definition of the two dispositions, and having agreed their existence as well as showing how they or their typical manifestations can be traced through some, at least, of the arts,¹ an attempt may be made to apply his conception to some of the races of the Eastern Hemisphere, beginning with "savages."

I have already stated that among the more primitive folk of whom I have personal knowledge (excepting Papuo-Melanesians), I have observed a more or less widespread tendency to ready dissociation of personality, while the instability of opinion (not custom) among savages and the ease with which an external diversion, a joke, or even a piece of showy rhetoric may completely alter their action is a commonplace among travellers. Nor are these characters limited to dwellers in the tropics: a widespread faculty for dissociation is found alike among the Esquimaux and the palæasiatic tribes of Siberia. These characters are extravert, and I may refer back to the passage on p. 15 defining the extravert type, in which I have italicised the sentences which no one with a first-hand knowledge of savages will, I believe, deny have a general application.

It is, indeed, fairly obvious directly the ideas of introversion and extraversion have been explored, that the savage would, from our standpoint, belong to the extravert type. I venture to think that no savage community containing a preponderant number of introverts would long survive, unless geographically isolated or protected by some special circumstance. There is, however, the interesting question how far chiefs and medicine men, often synonymous terms, differ from the mass. Are they introverts or do they possess notably introvert characters?

Before discussing this point, it is worth while considering whether all or the majority of savage tribes are equally extravert. In approaching this matter it is obvious that judgment will largely depend on the particular savages of whom the writer has experience, while his own disposition and standards of comparison will also play a part.

First considering only peoples whom I have myself observed, I would point out that the extravert disposition may manifest itself under different forms.

¹ As presumably they might through all, given a sufficiently able analyst; I use the word in its ordinary sense, not in that which it has recently acquired in clinical psychology.

No one who has lived with the Papuo-Melanesians of the Central District of Papua (British New Guinea) will doubt that here is a whole series of strongly extravert peoples, yet I have not observed ecstasy nor hysterical dissociation, though "possession" is said to occur, and I remember hearing of one instance in which it was definitely simulated. To the east among the kindred Massim, trances during which the soul visits the other world have been recorded, but here again there is an element of doubt, and the experiences of the other world reported by the visitants may be but lightly regarded by their fellows.

Here then are two great groups of tribes, extravert in behaviour, among whom, as it would seem, one of the most definite characters of the extravert disposition—frequent and easily brought about dissociation—is, or appears to be, absent, so that comparing these tribes with, *e.g.* the Veddas, among whom almost every individual passes at times into a dissociated condition, the observer would be tempted to conclude that the latter were incomparably more extravert than the Papuo-Melanesians. Yet it is doubtful whether this conclusion would be a fair one, for among the Papuans (true) of the Papuan Gulf and the deltas of the great rivers opening into it, there has lately been observed and described an epidemic form of dissociation at the height of which whole villages were overcome.¹ Yet this appears to be the first occurrence of anything of the sort recorded among these Papuans, who, as far as my limited experience goes, in other respects appear less extravert than do the Papuo-Melanesians.

Turning to Africa, the Dinka, with their utter lack of interest in the white man and his contrivances, their absence of desire for clothes and the usual trade objects, their extreme religious habit, their customary gravity and aloofness, all these factors finding expression in their strong desire to be left alone with their cattle, present a temperamental *facies* very different from the typical African negro (of whom unfortunately, I have no first-hand knowledge) or from the Azandeh. It seems, then, that from the politico-social aspect the Dinka may be regarded—for an African people—as relatively introvert, and they are certainly more so than any of the other savage or barbaric peoples with whom I am acquainted, though, perhaps, the Shilluk approach them in this respect.² Yet, in spite of this, whole villages have on occasion given themselves up to hysteria, which, as I am informed, persisted irregularly for weeks or even months.³

Turning now to the chiefs of these tribes, rain-makers who are also divine kings, *i.e.* who unite the temporal and spiritual sovereignty and who voluntarily lay down their life for their tribe when old age is upon them, my experience of their behaviour,

¹ F. E. Williams, "The Vailala Madness," *Anthropology Report No. 4*, Territory of Papua, 1923 (Port Moresby, 1923).

² It may be that the qualities I have described will prove to be common to the Nilotes generally, perhaps even to all or the majority of tribes of mixed hamito-negro descent.

³ W. L. Mills, "A Dinka Witch-Doctor," *Sudan Notes and Records*, vol. ii, 1919, pp. 31-34.

necessarily limited, does not suggest that they are more introvert than the average tribesman, but rather the opposite, though sense of responsibility, experience of white men and the desire to avoid friction with the government, may all have been factors in influencing their behaviour. Yet, leaving aside these reactions to a stranger, the ~~view~~ expressed is supported by the fact that all important rain makers are supposed to have immanent in them, temporarily or permanently, the spirit of a great or semi-divine ancestor, often the "historic" founder of the nation or tribe, who on appropriate occasions manifests his existence by "possession," i.e. the chief undergoes a typical hysterical dissociation.

In appraising these facts from the standpoint of the tendency to dissociation of chief and tribesman respectively, it must not be forgotten that the training for much of their religious ceremonial is also a training in the induction of dissociation by auto-suggestion. I have reason to believe that the varying faculty for this is sometimes considered by a Dinka rain-maker in naming his successor: certainly among the Veddas it was recognized that some individuals could not and would not make successful shamans.

The part played by religion in the two dispositions presents an interesting problem. As pointed out to me by Dr. Jung, among ourselves the extravert typically favours ceremony, definite cults with church, priests, vestments, music—in other words, collective worship. The introvert typically prefers contemplation, meditation, solitude, individual worship and carefully concealed mysteries. For him God is anywhere rather than in the church as formally constituted. Now, accepting the general truth of these statements, as experience suggests we may, how does this tally with the religious life of the more primitive peoples? As far as I can judge no such considerable difference of outlook is to be observed in savages: almost every act of worship that can be collective is collective, though naturally the size of the group varies enormously. If this conclusion be correct it fits well with the propositions already advanced in this paper.

THE TYPES AMONG CIVILIZED PEOPLES.

Turning to the civilized world, the temperaments of the European races have been discussed by McDougall¹ and by Lenz.² In general I shall follow the latter, since his view-point seems to embrace the wider horizon. The Nordic race excels other races in steadfastness of will and foresight, but this very steadfastness shades into stubbornness which in the individual is likely to lead to recklessness as to the results of his actions, not only to himself but to others. His power of organization is of great social value: nevertheless he is essentially an individualist, and as such

¹ *National Welfare and National Decay*, chapter v. The quotations from McDougall are not taken from his book itself, but from an article by B. S. Bramwell in the *Eugenics Review*, "Observations on Racial Characteristics in England," vol. xvi, October, 1923.

² Lenz, in Baur, Fischer and Lenz, *Menschliche Erblichkeitslehre*, Munich, 1923.

shows a definite incapacity to understand and sympathize with views not his own. However, his natural reserve generally prevents his thrusting his views on others, *i.e.* his general attitude is introvert. McDougall says he is "weak in herd instinct." It would, perhaps, be more accurate to say his "herd" tends to be small: indeed there is abundant evidence of this in the sagas. It is this individualism, with, I think, a certain capacity for mysticism, which in the religious sphere has led to that protestantism which contrasts so sharply with the dominant catholicism not only of Mediterranean but of Alpine lands. "The tendency to take careful thought of the future leads the Nordic to examine the whence and whither of the World and of Mankind. He is distinctly religious and philosophical, but his yearnings, not being easily satisfied, tend to drive him beyond the actual and into mere metaphysic."¹ Nevertheless he has an undoubted aptitude for science which is, perhaps, reinforced by a capacity for observation which seems to go with his love of the sea and of the country as opposed to town.

On the artistic side his strength, perhaps, lies in his sense of form (not colour),² and with this he has, perhaps, no great capacity for languages.

It is difficult for one who has not lived in Central Europe to form an opinion concerning the temperament of the Alpine race. Predominantly catholic, the Alpines lack the stubborn individualism of the Nordics, while it is generally agreed that they are specially suited to village life and show little tendency to adventure and colonization. It is indeed alleged that their interest in money and what it can buy is unduly pronounced, and that with this there goes a relative absence of genius or outstanding ability. A number of writers have attributed to the Alpines a certain quality of moroseness; if this be so, another aspect of this quality might be the steadfastness and capacity to bear punishment which the Swiss wars of independence showed them to possess. Dr. Jung has written to me of the average Swiss as moderately introvert, but if the morose quality referred to above be typical of the true Alpine, it must be capable of considerable modification as the result of a relatively slight admixture of blood, or else differentiation has proceeded within the stock, for it is impossible to ignore the cordiality (*Gemüthlichkeit*), especially to strangers, which is, or at any rate a few years ago was, so much more marked in Southern Germany than in the North.

Cursory examination has failed to yield any outstanding personalities in science in the Alpine race,³ but there can, I think, be little doubt that it has produced a

¹ Lenz, *op. cit.*, p. 422.

² Since writing this, Mr. Thornton has told me that in much German art the emphasis is rather on form than colour, *i.e.* as compared with modern British and French schools, but whether the artists are Nordic, or predominantly so, I cannot say.

³ Champollion (Figeac, Lot) had the short, broad face of an Alpine, but to judge from the reproduction of a painting given by Gunther, his hair and eyes, both dark, suggest Mediterranean blood.

number of the greatest musicians, or at least that certain of these, *e.g.* Beethoven and, perhaps, Schubert, had or have enough Alpine blood to give them the typical broad, short face. Of writers, this is true of A. J. Kerner (Württemberg) and, perhaps, of Balzac (Tours).

Of the Mediterranean race, McDougall writes: "The Mediterranean peoples are vivacious, quick, impetuous, impulsive: their emotions blaze out vividly and instantaneously into violent expression and violent action." This may be true as it stands, and no doubt the Mediterraneans generally are extravert, though if, as is generally stated, the South Italians, the most pronounced Mediterraneans of the group, will coolly shape their actions for years towards the consummation of a vendetta, it is, perhaps, somewhat exaggerated. The Mediterraneans show an intense appreciation of colour, glitter and movement, and Lenz draws attention to the important part played by illustrations in their papers. It would be interesting to know whether this applies alike to Italy and Spain and, whether it is equally true of Northern and Southern Italy. The great Italian schools of painting were all North Italian¹: it may be assumed the painters were so too, *i.e.* presumably not pure Mediterraneans: on the other hand, Spain, with a general Cephalic Index of about 77, and presenting less variation in physical type than any other equal area in Europe,² has also produced a series of great painters, predominantly extravert.

Whatever conclusions we may come to concerning the above, it must, I think, be recognized that the Mediterranean race has actually more achievement to its credit than any other, since it is responsible for by far the greater part of Mediterranean civilization, certainly before 1000 B.C. (and probably much later), and so shaped not only the Aegean cultures, but those of Western as well as the greater part of Eastern Mediterranean lands, while the culture of their near relatives, the Hamitic pre-dynastic Egyptians, formed the basis of that of Egypt.³

Turning to the peoples of the East, what are their characteristics from the standpoint of the two dispositions we have been discussing?

The old speculative India, with its mystical systems of religion and philosophy which we call Brahminism, was no doubt introvert, but how far introversion was the preponderant disposition among the upper classes generally, and whether it still plays as important a part in modern Hinduism as it did of old, my ignorance of things Indian forbids me say, though the history of Buddhism certainly suggests

¹ Mr. Thornton regards the Florentine school as introvert, the Venetian as extravert.

² Ripley, *The Races of Europe*, pp. 273, 274, *i.e.* apart from a considerable increase of brachycephaly in the highlands of the North-West.

³ That the Mediterranean race is a northern branch of the Hamitic stock is now, I believe generally accepted.

that it does.¹ This system, arising as a protest against the mystical formalism and particularism of Brahminism, although it made headway against Brahminism for centuries (partly no doubt because its sects made no difficulty in accepting in mild disguise much of the old mystic philosophy) and numbered millions of converts, yet at the present day is extinct in India.

I would add that caste, with its precise and unalterable determination of every man's position in the social fabric, seems to be just one of those examples of "arrangement" which are so typical of the introvert disposition (*supra*, p. 15).

Passing eastwards, even if he lacks first-hand knowledge of China and Japan, the ethnologist who has paid even slight attention to their history and to their arts and crafts immediately perceives that there is a profound difference in the modes of thought of the two countries. Japan is almost typically extravert, while China, if far less easy to understand and therefore to place, is certainly relatively introvert. A Chinese writer² has well described the different attitudes of the two nations towards outside influence, while if it be suggested that a Chinese may be no fair critic of the Japanese, there remains the estimate of the Japanese character written by an educated Japanese, Mr. Y. Okakura, and published in this country under almost official patronage.³

Mr. Liang Ch'i-Ch'ao writes: "The reception of foreign learning by the Chinese people differs from its reception by the Japanese. Japan is a small country, and moreover possesses no learning which is really its own. Therefore, if such learning arrives from without, the Japanese rush to it as though on galloping horses, change as rapidly as echo follows sound, and in the twinkling of an eye the whole nation is transformed. However, a careful estimate of their capacity shows that they are really nothing more than mere imitators: they are in no sense able to add anything of their own or anything they may have themselves initiated. Now China is not like that. China is a huge country with a learning of its own which has been

¹ Since writing the above I have found in a small book of Essays by Lowes Dickinson a passage bearing out the essentially introvert disposition of the modern Hindu. "The West is often called materialistic as compared with the East. But this antithesis, so far as it is true, does not depend on any metaphysical view held or denied as to the nature of matter. . . . The real point of distinction is, that the West believes that all effort ought to centre upon the process of living in time: that that process has reality and significance, and that the business of religion is not to deliver us from effort by convincing us of its futility, but to sanctify and justify it. No modern Western man would regard as an admirable type at all—still less as the highest type—a man who withdraws from the world to meditate and come into direct contact with the Universal. But an Indian who is uncontaminated by Western culture still regards that as the true ideal of conduct, and views all activities in the world as lower and inferior, though, for undeveloped men, they are necessary and pardonable." (G. Lowes Dickinson, *An Essay on the Civilizations of India, China and Japan*, pp. 13, 14.)

² Liang Ch'i-Ch'ao, "The Civilization of Japan," translated by Professor Giles, *Gems of Chinese Literature* (Shanghai, 1922, p. 271. The author, born 1872, is described as "one of the most brilliant of the band of reformers who succeeded in establishing the Republic."

³ *The Japanese Spirit* (1909).

handed down for several thousand years and which is so well fortified by defences that foreign ideas do not easily find their way in. Even if they do get in, for many—perhaps a hundred—years their influence will not succeed in rumpling the hair of one's head. It is like throwing ink into water. If the water is in a foot-wide bowl or in a ten-foot pool the ink will very rapidly discolour it all; but if the same ink is thrown into a mighty rushing river or into the wide and deep ocean, can these be easily stained in the same way? Again, although China is not receptive of foreign learning, from what she does receive she makes a point of extracting all the excellences and adapting these to her own advantage. She transmutes the substance and etherealizes its use, thus producing a new factor of civilization which is altogether her own. Her blue is thus bluer than the original indigo-blue of foreigners; her ice is colder than their water. Ah me! Deep mountains and wide marshes give birth indeed to dragons; but the footprints of our noble representative can never have been familiar to the small-sized gentlemen of the Country of Dwarfs."

Of Japan, Mr. Okakura writes: "Before entering into details about the various continental doctrines implanted in our country from China and India, it may be well to tell you something of the mental attitude of the Japanese in facing a new form of culture, in many senses far superior to their own. . . . The Japanese as a whole are not a people with much aptitude for deep metaphysical ways of thinking. . . . Warlike by nature more than anything else, they have been known from the very beginning to have had the soldier-like simplicity and the easy contentment of men of action. . . . The abstruse conceptions of Chinese or Indian origin have been received into the Japanese mind just as they were preached, and usually we have not troubled ourselves to think them out again; but . . . have generalized them straight away and turned them immediately into so many working principles. There are any number of instances of slight hints given by some people on the continent and worked out to suit our own purposes into maxims of immediate and practical value. Ideals in their original home are ideals no longer in our island home. They are interpreted into so many realities with a direct bearing on our daily life.

"This, as you will see, explains why we have failed to produce any original thinkers: this is why we have to recognize our indebtedness for almost all the important ideas which have brought about social innovation either to China or to India, or else to the modern Western nations. . . . We are, I think, a people of the Present and the Tangible, of the broad Daylight and the plainly Visible. The undeniable proclivity of our mind in favour of determination and action, as contrasted with deliberation and calm. . . . Pure reasoning as such has had for us little value beyond the help it affords us in harbouring our drifting thought in some nearest port, where we can follow any peaceful occupation rather than be fighting what we should call a useless fight with troubled billows and unfathomable

depths. Such, according to my personal view, are the facts about our mentality considered generally."¹

This opinion of a Japanese on his countrymen is borne out by the opinion of a Western traveller. The Japanese "are active, sensuous, ambitious, at need aggressive. They have to an eminent degree the qualities of citizens and patriots: and the influence of Buddhism has been with them more æsthetic than ethical. Japanese feudalism converted the Buddha's doctrine of renunciation into the Stoicism of the warrior. The Japanese Samurai renounced desire, not that he might enter Nirvana, but that he might acquire the contempt of life which would make him a perfect warrior. . . . And the Samurai, meditating in a tea-house on the beauty, the brevity and the pathos of life, and passing out to kill or to die, is as typical of the Japanese attitude to life as the wandering Sannyasin is of the Indian."²

The reference to the tea-house is particularly interesting, since the Tea Ceremony, essentially introvert in character, for some time played an important part in the life of the upper classes of Japan. Arising in China apparently in T'ang times, it was carried to Japan, where it was elaborated into a rigid formalism largely as it would seem in connection with the Zen philosophy. In Japan it was at first a distinctly religious ceremonial: a second or luxurious stage in which singing and dancing girls played a part is described in the 14th century, while some 200 years later the "art" of tea drinking had split into various schools. It was the head of one of these, Sen-no-Rikyū, who collated, purified and codified the ceremonies, taking simplicity as an essential canon of taste and instituting the elaborate code of etiquette still preserved at the present time. The room or house in which the tea is drunk is small and must be of a particular size, the guests not more than five. "The tea is made and drunk in a preternaturally slow and formal manner, each action, each gesture, being fixed by an elaborate code of rules. Every article connected with the ceremony, such as the tea-canister, the incense-burner, the hanging scroll, and the bouquet of flowers in the alcove, is either handled, or else admired at a distance, in ways and with phrases which unalterable usage prescribes. Even the hands are washed, the room is swept, a little bell is rung, and the guests walk from the house to the garden and from the garden back into the house, at stated times and in a stated manner which never varies, except in so far as certain schools, as rigidly conservative as monkish confraternities, obey slightly varying rules of their own, handed down from their ancestors who interpreted Sen-no-Rikyū's ordinances according to slightly varying canons of exegesis."³ All this seems a fair example of introvert behaviour, but the essentially extravert character of the Japanese comes

¹ Okakura, *op. cit.*, pp. 43-46.

² Lowes Dickinson, *op. cit.*, p. 68.

³ B. H. Chamberlain, *Things Japanese*, "Art. Tea Ceremonies" (London, 1890), p. 338. I have also found useful *The Book of Tea*, by K. Okakura (1919).

out in the huge prices, running to thousands of pounds sterling, paid for tea jars in recent sales at Tokyo.

The passage from the Chinese writer quoted above would suggest that the Chinese are as a nation introverts, or that introversion is at least the typical reaction of the majority: and that this is so seems confirmed by the extreme systematization of many departments of their life from the "philosophy" of lineal figures described in the *Yi King* to the rigid formalism, *i.e.* "arrangement" of modern Confucianism.¹ Among the greatest men of China there were certainly introverts. Lao-tze was one, and perhaps Confucius²; and these would not have influenced their country as they have if their writings and modes of thought were not sympathetic. Yet in the arts and crafts as we are but now getting to know them the position is far from clear. To take the greatest of Chinese crafts, that of the potter, alongside the constant tendency to copy their own old wares, there goes a continual effort to strike out new lines, and even (in late times) to force porcelain into the semblance of objects totally alien to its essential character, for the sheer joy, as it would seem, of overcoming technical difficulties. Again, in Chinese painting, though the manuals invariably exhort painters to copy what is old, and although great works were copied and re-copied, it is perfectly certain not only that there were men striving after something new, but that many of the best Chinese paintings show a liveliness and a going out to Nature that is certainly not introvert.

¹ Mr. Arthur Waley points out that developed Confucianism is "of much later date than Confucius himself," *Chinese Painting* (1923), p. 18.

² I find it difficult to place Confucius in either category; on the one hand he seems to have excelled in common sense, on the other stands the extreme formalism with which he codified the minutiae of "the antique tradition," and his regrets expressed late in life that he had never sufficiently studied the *Yi King*. Mr. Waley has the following interesting passage on the Confucian cult and the conception of the work of statesmen it implied. The function of the latter "is to preserve what the Ancestors have transmitted. Whatever change is made can only take the form of restoration. If an organization is to remain intact, each element in it must have a clearly defined function. These functions can be scheduled and tabulated, so that henceforward each member of the community may know exactly what are his public duties. But public and private life are closely interwoven, and even when all conflict has been removed from the machinery of state the home may yet produce frictions which will ultimately cause harm to the common weal. It is therefore necessary to regulate every domestic contingency down to the minutest detail of table-manners—'if there are herbs in the bowl, chop-sticks must be used; if there are none, it must be drunk out of the bowl.'"

"The immense importance attached to minutiae of personal conduct may be seen in many passages of the Confucian *Analekts*, particularly in the tenth book which describes the domestic habits of Confucius—how he walked, how he lay in bed, how he ate, and how he fasted" (*op. cit.*, pp. 18, 19).

This seems definitely introvert, both as regards the man and the system, though as to the former I still feel some doubts. Probably Confucius was an introvert sufficiently great to allow of adaptation to the extravert attitude which every statesman must assume.

THE DREAMS OF NON-EUROPEAN RACES.

Having dealt with some of the aspects of Extraversion and Introversion more immediately interesting to the anthropologist, and having, as I hope, sufficiently indicated that the two dispositions or types (however they may develop) are fundamentally expressions of qualitative differences in the unconscious, I now invite you to follow me into what I hope may be the beginning of a purposive investigation of the unconscious among non-European races.¹ I shall propose no division of these, but only point out that even if they differ among themselves almost as widely as the Veddas, with an average stature of just over 5 feet and a cranial capacity of 1,278 c.c., do from the Chinese,² they all differ almost equally in one direction or another from ourselves.

At the present time, when the only approach to the unconscious of other races is by way of the mechanisms—none too well known—we recognize in ourselves, the dream seems to offer the sole immediately available mode of exploration.³

Being a constant dreamer myself, and having had the opportunity of studying the dreams of a considerable number of men suffering from war shock, the first step taken was to draw up, in non-technical language, a short statement concerning dreams, and the scientific importance of recording those of non-Europeans, which, printed in *Sudan Notes and Records*,⁴ came to the notice of a number of the officials and missionaries in that country. I hope to deal elsewhere with the actual dreams recorded in answer to my appeal: here it is only necessary to say that the result, as might have been expected, was to show that among natives of the northern Sudan, all Moslems and for the most part Arabicized mixed breeds, dreams are provoked by conflict, and that there is the same general difference between the manifest and latent content that there is among ourselves, while those recorded by Mr. H. St. J. B. Philby as dreamed by Ibn Sa'ud, who I suppose may now be called Sultan of Central Arabia, are obvious wish fulfilments.⁵ Further, my own

¹ My reading indicates that what records we have among non-Europeans have not been gathered from the point of view of the study of the unconscious.

² I need not here refer to the success of China in the Middle Ages, or to the amazing skill of her citizens in the arts and crafts, but if, as Dr. Jung informs me, China has "not less than 30 per cent. more individuals of [specially] great cerebral volume, in comparison with the European population," we have not far to seek to explain her triumphs, which must not be judged entirely by Western standards.

³ I purposely exclude the examination of myths, since for each incident the question of possible transmission must be considered.

⁴ *Sudan Notes and Records*, "Note on Dreams," vol. iv, 1921, pp. 156-61. By permission of the Editor, this was reprinted with modifications suggested by experience in *Man*, December, 1923, under the heading, "Psychology: Dreams."

⁵ "Last night," so Ibn Sa'ud told Mr. Philby, "I dreamed a dream and it has frequently come to pass that God has vouchsafed me visions of the future in such dreams. Many years ago I saw in a dream a lofty minaret which the Sultan of Turkey—it was 'Abdul Hamid—was trying to climb: he failed at each attempt, and at length he gave it up murmuring that he had not the strength to reach the top. Soon after that I heard that he had been deposed. Again,

experiences among Sudanese Arabs as well as Nile Negroids show that the appearance in dreams of a dead relative (often the father, who may demand a sacrifice) is by no means uncommon, and this is true of other and more primitive peoples, *e.g.* both Papuo-Melanesians and Veddas. Among the latter they are regarded as decidedly uncanny¹: probably to some extent this holds true of Melanesia generally, though among Papuo-Melanesians the elements of wish-fulfilment and identification may at times come in, at any rate it was stated by the Koita of Port Moresby (Papua) that dead relatives commonly appeared as they were in their prime, and not infrequently wearing their dancing ornaments. Beyond this I have records from the Motu of certain dreams which were regarded as omens. The records are brief and lacking in detail, but to any one cognizant with the daily life of the people it is obvious that three good omens all present wish-fulfilments, while of three bad omens two are visions of disaster (in one case wreck of a large trading-raft), while the third, as recorded, is indeterminate.²

As to Black Africa, from the Dinka, the most religious people I know, I have the record of a dream, the result of acute conflict as to whether the subject should become a Christian, and conversion dreams after severe conflict have been recorded of the Basuto.³ Another informant, an Acholi, had dreams exhibiting the revival of the happenings of childhood and adolescence. One of these was an anxiety dream concerning the herding of sheep, a dream which he assured me he had dreamt more than once as a boy.

For information concerning West Africa I am indebted to Mr. R. S. Rattray, Government Anthropologist, who has sent me most interesting material, from which I take the following:—

Dreams of ancestors are common and usually betoken nothing more than that the dead man is hungry, in which case the descendant places food on his ancestor's blackened stool or offers it in some other manner. Ancestors or dead relatives may appear and indicate good hunting grounds or trading places. "If you dream

about six years before the war, I dreamed and saw the present Sultan, Muhammed Rashad, walking in a flourishing garden: again I looked and the garden was in ruins. "Who art thou?" said the Sultan, seeing me, and I replied "Ibn Sa'ud." And last night I saw a lofty minaret, as it were the minaret of the mosque at Damascus:— incidentally he had never visited that city— and a crowd of people were firing at it without avail: then I came up with my people and we fired at it and it fell. Assuredly this dream means that the British will capture Damascus, but not without my help." *The Heart of Arabia*, vol. i, p. 335.

¹ C. G. and B. Z. Seligman, *The Veddas*, p. 136.

² C. G. Seligman, *The Melanesians of British New Guinea*, p. 113. There is a section on dreams in Gunnar Landtman's *Folk Tales of the Kiwai Papuans* (Helsingfors, 1917), and omen dreams are recorded (pp. 441-43). In one a man dreams that a kangaroo is taken by an "alligator" and he feels nervous about his sister, whom he afterwards hears has really been taken. The Kiwai are totemic, and it seems probable that the dreamer and his sister were "kangaroos," but nothing is said on this matter. The other "omens in dreams" recorded are scarcely true omens, but rather visions of the modes of death of individuals who die shortly.

³ Robert Keable, "A People of Dreams," p. 527, *The Hubert Journal*, 1921.

and see your ancestors coming home followed by a sheep then you know you will have to sacrifice a sheep to them." Sometimes the elements of conflict or worry succeeded by wish-fulfilment are clear. "The last dream I had about my uncle (who had already indicated a good trading place in a dream) was that he was giving me some leaves. I told my dream to others. At that time a child was very ill in the house, and they told me to make medicine with the same leaves, and I did so and the child recovered." But ancestors may also appear in animal or half-animal forms. "An ancestor who has a bad *sansum* (spirit) may appear as a cow and chase you all night. As soon as he overtakes you, you wake up. You must find medicine and bathe to drive away that ghost." The same man once dreamed of an ancestor "who was half an animal, the yellow-backed duiker, and half a man: that was a bad ghost." If you dream of ancestors who take you by the hand they are trying to lead you to the spirit world, and unless you have powerful "medicine" you will die. "Sometimes you see an ancestor sitting on a chair and then you see he has become a tree or a sheep. Sometimes you hear a voice but do not see anyone."

The general principles of dream interpretation, where ancestors are not directly involved, seem to be two. In the first place, the interpretation of many dreams is by opposites: thus:—

"If you dream you have found gold you will always be poor."

"If you dream that you are all covered with white clay (a sign of joy), it means you will be covered with red clay (a sign of mourning)."

"If you dream that someone is dead, it forebodes good for that person and that the sky god will bless him."

"If you see someone covered with sores or in rags, that person is going to live long."

But besides this interpretation by opposites, there is also an interpretation by similarity, or I suppose I may say association. "To dream you are pulling up mushrooms means a funeral, because you leave a hole, *i.e.* a grave."

"To dream about a snail means a funeral, for ghosts live chiefly on snails."

"If you dream about fish, your wife will conceive." Fish are the children of the gods, for certain rivers and lakes are among the most powerful of gods, *i.e.* possess immense creative energy.¹

"To dream of a house without a roof means that someone will die in the house, because in the spirit world houses have no roofs."

"If you dream that a hunter has killed an elephant, some chief is going to die."

In Africa the elephant is commonly a symbol of the King or of great power or strength. Thus the Zulus addressed their King as "Great Elephant," "Powerful Elephant," &c.²; in Ashanti, as Mr. Rattray informs me, a chief may be referred to as "Elephant," though I understand that this is not common usage.

¹ R. S. Rattray, *Ashanti, cf. &c.*, pp. 143, 146

² J. Stuart, communicated.

So far I have dealt with the dreams either of individuals of predominantly mixed "Caucasian" blood or of those of the lower races. We may well ask ourselves, what of the dreams of that great division of mankind whose most advanced people has equalled, if not excelled, our own in arts and crafts, whose politico-social system in some respects resembles certain European systems, and who, apart from such temperamental differences as the absence of admiration for militarism and desire for territorial expansion, differ from ourselves at the present day mainly in their having shown neither capacity for scientific discovery nor aptitude for the application or practice of the standard processes of Western science. The inquiry into the nature of the dreams of Mongolian peoples appears to me to have a quite special interest which, if pursued steadily and methodically, may, it seems legitimate to hope, give us the dreams of a series of peoples of predominantly the same stock, but living in the most diverse environment and varying in civilization from barbarism to the highest culture.

Considering first the more primitive members of this great group, I am fortunate in having received from Mr. J. H. Hutton, C.M.G., and Mr. J. P. Mills, a number of Naga dreams with notes and explanations which, added to the material contained in their published works and those of other authors, offers a considerable body of material for examination. At this stage I might point out that the Naga tribes, though forming no such homogeneous nation, stand on very much the same level of civilization as the Ashanti, already discussed.

Mr. Hutton writes to me that he gathers that to the Nagas the significance of their dreams is ordinarily dependent upon their presenting a definite symbol of known collective or individual application, especially if the dreamer be awaiting a dream upon which he may base his future action. Apart from such interpretation, the individual may put his own construction on a dream: the records I have, suggest that this is specially likely to happen when the affect is strong, though when in doubt the dreamer would probably consult his friends or the older men of the village. An examination of the material I possess indicates that interpretation by opposites is relatively uncommon, and even when it does occur there are, in some instances, perfectly logical reasons given or hinted why the manifest symbolism should be reversed. On the other hand, interpretation by association is well developed. Moreover, there appears to be considerable freedom, *i.e.* personal association in the interpretation of a symbol, for this may vary not only from tribe to tribe, but also between communities and even individuals.

Some examples are as follows:—

"Red stands for the blood of man, and to dream of anything red, such as a red spear or red goats' hair, means that someone will get hurt."¹ Water is equated with the crops, "so that a vision of a deep pool means a good harvest, but a dry nullah means a lean year."²

¹ J. P. Mills, *The Lhota Nagas*, p. 172.

² *Ibid.*, p. 17

The fire-dream may be taken as an example of a varying interpretation, if not from person to person, at least from group to group. Of the Lhota Nagas, Mr. Mills records that in dreams fire represents children. "A fire which burns up well when the dreamer lights it means a big family, but a fire that goes out foretells death in the home."¹ But among certain Nagas of Manipur to see fire in a dream betokens a hot summer and even that the crops will be ruined,² while among others it betokens the approaching fall of rain.³

The following episode occurring in the dream of a Sema Naga, sent me by Mr. Mills, is interesting both for its content and for the analysis supplied. There had been two previous episodes in the dream, which present no obvious contact with each other or with the following: in fact, they present that tele-coping of incidents and places which is so common in our own dreams:—

" . . . I got down and found myself in my village. I found myself in front of Khuikhe's house. There was a bamboo platform there, built all crooked. Zuikhu (who is dead) and Sakhishe were there. I asked Sakhishe why the platform had been built crooked. He said, 'It is their way. They can never build a platform straight.' I said, 'My platform is large and level. They ought to have built one like mine.' Sakhishe said, 'Yours is different. That is why it is so good.' Then I found myself in my house with my family and Zuikhu and Sakhishe. We all sat round the fire. There was a sudden gale of wind. I held the post fearing my house would be blown over. The gale stopped. I looked at all my posts, and especially at the carved one in front of the door, and said, 'If it had not been for this post my house would have fallen and I should have had a lot of trouble.' Sakhishe agreed. That was the end of the dream." The explanation ran as follows: "Khuikhe's platform was of the kind put up after a sacrifice. His clan will flourish, but because the platform was crooked it will not be entirely successful. The fact that I saw Zuikhu forebodes ill to his clan. The gale of wind in my house means that I shall have very bad crops this year. No post fell, so no important member of my clan shall die. The excellence and strength of my carved post means that I shall have fine sons and daughters."

For the following account of a dream of a Lhota Naga at the time that he had pneumonia in 1921 I am also indebted to Mr. Mills. It is particularly interesting in that the "men" had animal heads besides other abnormalities, while the dreamer was so impressed that three years later he volunteered the information that "he had always" remembered it:—

"Three men came to me when I was sitting in my house. They were dressed like plains-men, in 'dhoties.' All their clothes were white. I asked them why they had come. One said, 'We go about dancing.' They all three had heads like cows

¹ *Ibid.*, p. 172.

² T. C. Hodson, *The Naga Tribes of Manipur*, p. 130.

³ T. C. Hodson, communicated.

and horns like goats. But they had men's bodies. The backs of their heads were full of holes like honeycombs. Their eyes were men's eyes, though their faces were cows' faces, and they could speak. They seemed to have no skin on their faces, which were the colour of old bone. I was frightened and thought they were wizards. They asked if they could dance in our village. I told them to go away. They said since I would not let them stay and dance they would go to Are village. I took them a little way along the path. I came back and woke up before I reached my home again."

Explanation: "Had they danced many men would have died in our village. I made them sit outside my house. Had I let them in I should have died. They went to Are, I expect. Anyhow, four or five men died of dysentery there."

Regarding other Mongolian peoples, I may refer to the conventional system of wish-fulfilment dreams by which the Sea Dyaks of Borneo obtain a spirit-helper (*mpurong*).¹ Rather higher in the scale of civilization stand the Achéhnese, whose dreams are mentioned by Snouck Hurgronje. Here, to dream of walking under an umbrella (in the East one of the common signs of dignity and power) is taken to betoken worldly success, as is riding on a horse or elephant.²

It is, however, the dreams of the Chinese that would be of most interest to us: actually, I have been able to discover little concerning these. As will be shown towards the end of this paper, such "type dreams" as the tooth-losing dream, the flying dream, and the climbing dream all occur. One of the poems of Po Chü-I, translated by Mr. Arthur Waley, is a fairly obvious wish-fulfilment,³ while, under the title of "The Pitcher," Mr. Waley has published the translation of a poem by Yuan Chên (A.D. 779-831), the record of an anxiety dream rich in symbolism, the latter part of the poem constituting a partial analysis of the episodes of the dream.⁴

What is wanted is a considerable corpus of dreams collected from different classes of the population, while there is one dream which should especially be sought among the ranks of the *literati*, a group of men who have attained office as the result of an even more strenuous system of examination than that applied to our own professional men and civil servants. Here, it should be possible to discover whether the unconscious of the Chinese professional class has selected one of the anxiety symbols picked out by the unconscious of the corresponding European class, *i.e.*, whether they, too, suffer the dream, so common among ourselves, of having again to take the final professional examination.⁵ Other type dreams known among ourselves occur among the Chinese: if they, too, have the examination dream we have

¹ C. Hose and W. McDougall, *The Papia Tribes of Borneo*, vol. ii, pp. 90-99.

² *The Achéhnese*, Leyden, 1906, vol. ii, p. 43.

³ *More Translations from the Chinese*, pp. 45, 46.

⁴ *Op. cit.*, pp. 81, 82.

⁵ Mr. Z. L. Yih, of the School of Oriental Studies—the only Chinese I have as yet been able to consult—has no doubt that educated Chinese do have this dream.

an example of Caucasian and Mongolian minds expressing their difficulties by the use of identical symbols due to a similar educational device.

At this stage we may, I think, review the situation. Among primitive peoples, including such diverse stocks as Negro and Mongolian, it is found that the significance of dreams is reached by two identical processes, viz. :—

- (i) The attribution of a meaning directly opposite to the manifest significance :
and
- (ii) The discovery of their meaning by association, in which the manifest content of the dream is rejected, the symbolic nature of the dream images recognized, and their latent content sought, in fact, by an elementary analytic process.

That the two modes of interpretation dovetail into each other is not surprising, nor that there is perhaps a tendency (presumably a secondary development) for interpretation by opposites to increase at the expense of the more personal method of association. As among ourselves, interpretation by opposites has the advantage of presenting a simple rule, particularly applicable and comforting in just those cases where the affect is most unpleasant.

TYPE DREAMS.¹

A study of dreams in which symbolism occurs, soon shows that certain dreams recur so frequently, *i.e.* in so many different subjects, all or many of whom attach the same meaning to them, that they may be regarded as "type" dreams. Such dreams are, *e.g.* those of flying and the loss of a tooth or teeth. Particular symbols may even be selected by special classes, *e.g.* the examination dream which, from inquiry, I know to be common in this country as it is on the continent. But interesting as such dreams are among ourselves, it seems to me that their main interest and importance lies in the chance they offer of exploring and comparing the unconscious of the white and other races. If it can be shown that identical symbolism (*i.e.* identical symbols with the same meaning attached to them) is to be found in the dreams of unrelated races differing profoundly in their civilization and social organization, then we shall have to admit that the unconscious of the most diverse races is qualitatively so alike that it actually constitutes a proved common store on which fantasy may draw, and it becomes imperative to give full

¹ It is unfortunate for the purposes of this paper that the word "type" should have been used by Jung in his discussion of the forms of dispositional reaction, and also be the term applied to a particular description of dream. I need scarcely say that the uses of the word are entirely distinct.

weight to this in our discussions of the origin of myths, beliefs and even, perhaps, the simpler implements and technical processes.¹

Now, in the present stage of our knowledge, what evidence is there of the existence of type dreams with identical symbolism and meaning among European and non-European races? It is obvious that the evidence can not be complete: not only have field-workers failed for the most part (as far as I am aware) to direct their attention to the existence of such dreams, but anyone searching through literature will be surprised to find how few dreams, other than those connected with the appearance of ancestors, are chronicled and how badly even these few are recorded.² It is indeed rather surprising that it has been possible to collect as much as is here presented, while the absence of examples from India is not to be taken as implying that the dreams found in natives of other parts of the world are not to be found there, but simply that, knowing little of the literature, there was not time to search it before writing this paper. So, too, lack of time due to ill-health must be my excuse for giving a number of references, which I owe to the kindness of correspondents, but which I have not had time to verify myself.

I now propose to examine the distribution in the Old World of the three type dreams concerning which I have most information. These are:—

- (i) The tooth-losing dream.
- (ii) The flying dream.
- (iii) The climbing dream, *i.e.* the dreamer ascends a hill, climbs a tree or goes up a flight of stairs.

The New World is excluded for the same reason as India, while, apart from a few possible references to the flying dream in Australia, I have been unable to find publications giving the necessary information for the Pacific.

TOOTH-LOSING DREAM: The following is an outline of what I am able to discover. On present evidence this seems to be the most universal of type dreams, with everywhere the same significance, namely, the loss of a near relative or friend.

¹ While touching on this vexed subject, I may perhaps be allowed to suggest that the wide, if not universal, distribution of certain magical beliefs and practices may be paralleled by the distribution of type dreams, and thus, as it seems to me, be at least as likely to owe their origin to wish-fulfilment fantasies as to their common distribution from a single centre, or to their being a recollection, however distorted, of a once actual condition. I would not, however, press this argument in the Mediterranean area or indeed in the Near East, where 2,000 years ago there was broadly a common civilization, and where the writings of such men as Artemidoros may have led to a general dissemination and confusion of Greek ideas and beliefs.

² No doubt due to the influence of the Tylorian doctrine of animism, and lest I should seem overready to criticize my colleagues, let me say that I fully recognize the difficulty of obtaining accounts from natives of their dreams, also that in the past none have erred more grievously than I.



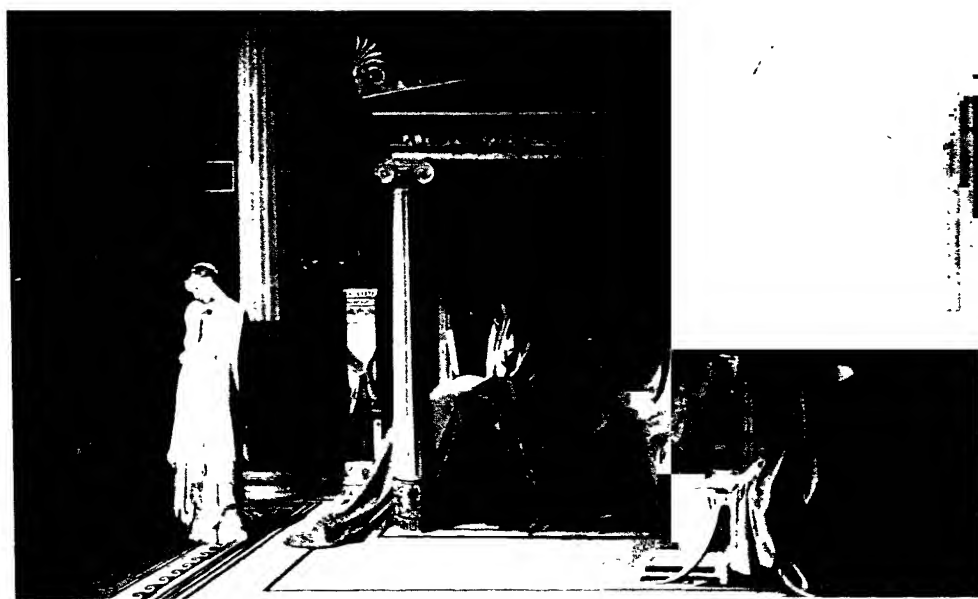
1. RUBENS. *Danza Compestre.*



2. POUSSIN. *Bacchanal.*



1. DELACROIX. *Dante et Virgile.*



2. INGRES. *Antiochus et Stratonice.*



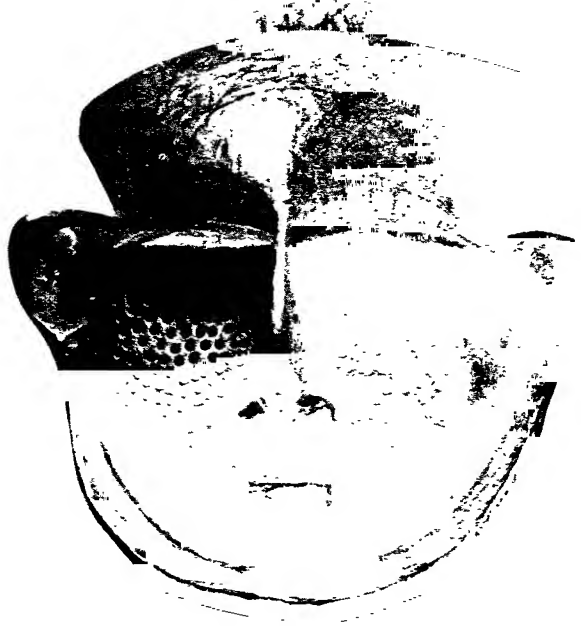
2. INGRES. SELF-PORTRAIT.



1. DELACROIX. SELF-PORTRAIT.



1. MASK, PROBABLY FROM IVORY COAST.



2. MASK, BUSHONGO.



3. HEAD OF STAFF, PROBABLY FAN.



4. WOODEN FIGURE, BAYAKA.

though not infrequently there is a modification of meaning according to the particular tooth lost or whether it is in the upper or lower jaw.¹

Europe. It is probable that this dream is interpreted as meaning the death of a near relative or friend all over Europe and perhaps the Near East, but I have not been able to examine the literature of the Mediterranean peoples, and for the following references, as far as they apply to Northern and Central Europe, I am indebted to Dr. Roheim; Scotland,² Ireland,³ England,⁴ Germany⁵ and Hungary.⁶

Africa. Northern Sudan. "If you dream that a molar or eyetooth is broken or falls out, the head of your family will shortly die." "The breaking or loss of a front tooth foretells trouble of no great moment or the death of a child."⁷ *Ashanti.*—"Your greatest friend is about to die. 'Me se abofua aba,' my hunter's [canine] tooth has come out, is an Ashanti saying meaning you have lost a near and dear clansman."⁸

Asia. Palestine. and probably generally spread in Mesopotamia,⁹ while, as pointed out to me by Mr. Torday, James Morier puts a most interesting passage in this sense into the mouth of his hero, Hajji Baba.¹⁰

Nagas. "An early death in the family."¹¹ "Particularly unlucky, and forebodes the certain death either of the dreamer or one of his family."¹² Among the Angami Naga "the loss of a tooth betokens the death of the mother's elder brother; the Thado, too, apparently tend to regard the loss of a tooth as more particularly associated with the death of maternal relatives though not limited to them."¹³

Malays (of Peninsula). "If a tooth of the upper jaw snaps off it is a sign that a brother or sister or someone of your kindred will die."¹⁴

¹ It is worth noting that, in the unconscious of the males of the white races, the tooth-losing dream is the equivalent of, or replaces, or stands for, the fear of castration. This has, in my opinion, been definitely shown by psycho-analysis: it certainly required very little effort to uncover this fear in two of my own war-shock cases. Moreover, it is probably true to say that, in the unconscious, fear of castration is equated with fear of death.

² W. Gregor, *Notes on the Folk-lore of the North-East of Scotland*, p. 29.

³ Communicated by Mr. Dermot O'Brien, of Westport, co. Mayo.

⁴ Henderson, *Notes on the Folk-lore of the Northern Counties*, p. 111.

⁵ A. Wulke, *Der Deutsche Volkserglaube*, p. 228.

⁶ G. Roheim, communicated.

⁷ J. W. Crowfoot, communicated.

⁸ R. S. Rattray, communicated.

⁹ For this information I am indebted to Dr. Viktor Christian.

¹⁰ "Out of the dirty manure cometh rich fruit and cucumbers: so out of evil cometh good," said he [Mohamed Beg]. "I may now lay my head on my pillow in security, with the certainty that my boy is alive. I cannot now dream that I have lost my favourite tooth, since it no longer exists. But as for our master (may his liver turn into water), you will soon hear that his child is no more: for three nights ago he told me that he had dreamed of the loss of a tooth." *The Adventures of Hajji Baba of Ispahan in England* (1828), vol. II, p. 273.

¹¹ T. C. Hodson, *Naga Tribes of Manipur*.

¹² J. P. Mills, *The Lhota Nagas*.

¹³ J. H. Hutton, communicated.

¹⁴ W. Skeat, *Malay Magic*, p. 669.

Aset. Achahese. "Early death of himself or his parents or children for him who is seen . . . lacking a front tooth, and the death of a brother or more distant relative for him who loses a molar."¹

Java. If in dream a tooth is lost from the upper jaw, an older relative will die: if from lower jaw, a younger.²

China.—"One of his family is near death."³

Japan. Death in the family, a loss of an upper tooth betokening death of the father, of a lower tooth of mother.⁴

FLYING DREAM: All variants occur among ourselves, from huge leaps taken with only the slightest effort to levitation with speed in movement so that the subject has no difficulty in rising and steering through an open first-floor window. It is not, as far as I can ascertain, ever a painful or unpleasant dream and generally seems to be associated with a sense of exhilaration. (As far as I know, wings do not occur, though flapping movements of the arms may.) By psycho-analysts its significance is generally taken to be sexual: the only instance I know in which this is recognized by laymen is in Tyrolese folk-lore, where the flying dream is regarded as a preliminary to an emission.⁵ But apart from any recognized erotic significance, the dream is generally regarded as "good."

The distribution of the flying dream according to my present knowledge is as follows:—

Europe. Probably general throughout the Continent: in the Tyrol (*supra*) its significance is definitely erotic.

Africa. Rhodesia. Ba-Ila. "If . . . he dreams of flying through the air, going flying over the trees and next morning tells them (the Elders) 'I dreamt of flying,' they will tell him 'You live very well. It is life. That is a great dream.'"⁶

Bakwile. A good dream, long life.⁷

Loango. Significance not recorded.⁸

Asia. Naga. A "good" dream, signifying the growth of the body in the young or adolescent.⁹

Java. Good luck.¹⁰

China. Good luck.¹¹

¹ C. Snouck Hurgronje, *The Achahese* (Leyden, 1906), vol. ii, p. 43.

² "Inggri," *Explanation of Dreams, Djawa* (Weltevreden, Java), vol. ii, 1922, No. 4, p. 178.

³ H. Gray, *China*, vol. ii, p. 10.

⁴ K. Miura, "Ueber Japanische Traumdeuterei," in *Mitt. der Deut. Gesell. für Natur- und Völkerkunde Ostasiens* (Tokio), vol. x, 1904-1906, p. 296.

⁵ Communicated by Dr. Rook, of the Vienna Museum, himself a Tyrolese.

⁶ Smith and Dale, *The Ilu-speaking Peoples*, vol. ii, p. 136.

⁷ F. H. Melland, *In Witch-bound Africa*, p. 225.

⁸ Peschuel-Loesche, *Die Loango Expedition* (1907), vol. ii, p. 301.

⁹ J. H. Hutton, communicated.

¹⁰ "Inggri," in *Djawa* (Weltevreden, Java), "Explanation of Dreams," vol. ii, 1922, No. 4.

¹¹ J. H. Gray, *China*, vol. ii, p. 10.

THE CLIMBING DREAM : Under this heading I would include climbing a tree, hill or ladder, and, among ourselves, going upstairs.¹ This dream is generally regarded as betokening success, sexual or otherwise.

Europe. The following passage is taken from a popular dream book, under the heading "ladder" : "Brennius Salustis says, 'This dream has great import. Art thou young and dreamest that thou hast reached the top of the ladder, thou hast a bright prospect before thee, and thou shalt attain it. Thou shalt kiss in wedlock thy coveted bride or thy longed-for bridegroom. . . . It is the portent of wealth, honour and human glory. Thou tiller of the ground, dost thou dream of reaching the top of the ladder ? Thy grounds will bring forth plentifully, and make thee rich. Scholar, student, collegian, up, up, you will reach the climax of your ambition. And thou poor widow, if thou dreamest this, shalt light thy coal again and thy sorrow shall be turned into joy.'"

Albania. "To dream of going up a mountain was the very best thing possible and brought luck."²

Africa. Rhodesia. Ba-Kaonde. "If one dreams that one is climbing a tree, or is on the top of a hill, it is good : one has long to live."³

Asia. Naga. "Among the lucky dreams none is more welcome than climbing a tree."⁴ So among the Angami Naga "climbing to the top of a tree means a long life for the dreamer, while inability to climb betokens an early death."⁵

China. "That he is climbing a tree, much honour and renown."⁶

Japan. To climb rocks or mountains is a good dream.⁷

¹ By psycho-analysts the climbing dream, especially ascending stairs, is generally taken to have a sexual significance, but it may have other connotations, especially success in life. Jung has recorded a stair-climbing dream of one of his patients in which at first sight the stairs appear to have a typical erotic significance, but which analysis shows to signify "getting to the top ; making a success of life ; being grown-up ; being great." *Analytical Psychology* (1917), p. 220.

² I am indebted to Miss M. E. Durham, who writes as follows, for this information : "I once had a terrible seven or eight hours' march in the North Albanian Mountains, which culminated by my having to clamber up about 1,000 feet of rocky cliff in a burning mid-day sun. It almost did for me and I could not sleep after it, but kept dreaming I was climbing and clutching at hot rocks and waking with severe cramps in arms and legs. Next day I was pretty exhausted and explained how I had slept badly. I got no sympathy. Everyone said that to dream of going up a mountain was the very best thing possible and brought luck."

³ F. H. Melland, *In Witch-bound Africa*, p. 245.

⁴ T. C. Hodson, *The Naga Tribes of Manipur*, p. 131.

⁵ J. H. Hutton, communicated.

⁶ J. H. Gray, *China*, Vol. ii, p. 11.

⁷ K. Muira, *op. cit.*, p. 293.

CONCLUSIONS.

(1) The two dispositions or reaction types distinguished by Jung as extravert and introvert are to be regarded as innate. In Europeans it is probable that extraverts somewhat predominate.

(2) It is suggested that in European matings, where the offspring show alternate inheritance, the inheritance of "type" may correlate with the inherited physical characters, but this is a matter for further investigation.

(3) It is suggested that among ourselves the two "types" exercise a strong sexual attraction upon each other.

(4) Compared with North Europeans, those savages of whom I have personal knowledge are extravert, while literature suggests that this holds for many other savage and barbaric peoples. Regarding ready dissociation (hysterical) as a typically extravert character, then in at least some instances chiefs appear to be even more extravert than the mass of their commoners.

(5) The essential dream mechanisms of non-Europeans, including savage and barbaric peoples, appear to be the same as in ourselves. Thus dreams with symbolism, sometimes elaborate and recondite, often simple and obvious, occur. These dreams may be wish-fulfillments or be provoked by conflict.

(6) Among the peoples investigated dreams may be interpreted conventionally (often by opposites) or by association, *i.e.* by an elementary self-conducted analysis.

(7) Dreams with the same manifest content to which identical (latent) meanings are attached (type dreams) occur, not only in cognate groups, but among peoples of diverse race and in every stage of culture.

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PSYCHO-ANALYSIS AND ANTHROPOLOGY.¹

By ERNEST JONES, M.D., *President of the International Psycho-Analytical Association.*

WHEN a worker in one field presents to those in another field some of his conclusions in the hope that they may be of interest and use when applied to other data, it behoves him to do so in a duly tentative and modest spirit. This attitude is particularly called for when his sphere of activity possesses such peculiar characteristics as does that of psycho-analysis, where he knows that he can only count on incredulity and opposition from those not familiar with the subject. The instinctive resentment, however politely disguised, which is felt towards an intruder who ventures to make suggestions concerning the work of a strange group can only be intensified when these suggestions are as unwelcome and unflattering as so many psycho-analytical ones are. The present occasion possesses, however, one feature which may prove to be of historical interest: it is, I believe, the first time that the doctrines of psycho-analysis have been propounded before an anthropological audience.

Three considerations encouraged me to accept our President's invitation to say something about the work on which we are engaged, and to point out the bearing which I conceive it to have on anthropological studies. In the first place, a psychologist has after all a certain claim to be represented in such studies, inasmuch as the mental data there investigated form a part of his own province. Indeed, in appraising the interpretation of mental data, and in coming to some judgement on their meaning and significance, the psychologist should really have as much to say as the collector of the data; that he has had so little say in the past has depended more on the backwardness of his own science than on the logic of the situation. The earlier authorities on anthropology, such as the founders of this Institute, had two deficiencies so apparently overwhelming that the distance to which they were able to proceed in spite of them must compel our deep respect. For they had not observed themselves the mental phenomena which they studied, nor were they trained in the psychological interpretation of such phenomena. Anthropologists have freely recognized this state of affairs, and the members of the younger generation have taken practical steps to remedy at least the first of the two deficiencies just mentioned. As a result the field-worker to-day has an unquestioned advantage over those to whom in overweening pride he sometimes refers as "armchair anthropologists." He also starts fair with the psychologist, each possessing one advantage and one defect. In these circumstances the two can only profitably approach each other in a spirit of mutual benevolence and co-operate together in their work until they are both

¹ Read before the Royal Anthropological Institute, February 19th, 1924.

superseded by a race of anthropologists who are experienced in field-work and also trained in the methods of modern psychology. The first member of this race, however, has yet to make his appearance.

In the second place, the similarity of the data investigated by anthropologists and by psycho-analysts is often so striking and unexpected as positively to call out for explanation, so that it becomes one's duty at least to draw the attention of anthropologists to the fact. In our laborious investigations of the hidden recesses of the mind we come across some group of ideas, some implicit belief, some mode of mental functioning which is altogether alien to our experience of the conscious mind as we know it, and for which no counterpart is to be found in our experience of life. The findings are so unequivocal that we have to accept them empirically even though we may not be able to relate them to any previous knowledge. Further, certain features accompanying them lead us to infer that they represent a more archaic layer of the mind than those we are accustomed to, one which has been passed and covered over by the latter in the course of development. Then to our amazement we read that identical beliefs or forms of thought have been recorded either in the folk-lore and mythology of bygone days or in savage races of the present time. What are we to think of this? To begin with, it must confirm our conclusion that the findings were not artefacts of our observation, and also that they represent some more primitive stage of mental development. But the obvious question of the relation of the two sets of phenomena to each other at once raises some of the most obscure problems of biological psychology, and opens up the whole subject of culture and inheritance. Of the innumerable examples that could be brought forward I will cite only one, but it should be enough to indicate the sort of thing with which we have to deal. In his investigations of the sources of "dream thoughts," the thoughts that lie behind the "manifest content" of dreams, Freud made the astonishing discovery that they never contain a negative, so that a positive idea and its exact opposite are treated as being identical. To put it plainly, contrasting ideas like "big" and "little," "strong" and "weak," "old" and "young" are treated as though they were interchangeable identities, and it is only from the context that one can discover which of the two is meant in any given case. It would be hard to imagine anything more senseless or more remote from our ordinary mental processes, but repeated confirmations of the finding forced Freud to accept it empirically, although he could give no reason for its existence. It was only many years later that the matter became somewhat more comprehensible to him¹ on coming across a work by a philologist, Abel, dealing with just the same phenomenon in the early stages of the oldest languages, Egyptian, Arabic and Indo-Germanic, and showing that the present differentiation has proceeded from an original identity of opposite ideas. There are interesting traces still left even in modern languages, such as with the word

¹ Freud, "Über den Gegensinn der Urworte," *Jahrbuch der Psychoanalyse*, 1910

"cleave," which means both "to adhere to" and "to separate." This example is one of a mode of thought, and alike ones could be quoted relating to definite beliefs or other groups of ideas.

The third of the considerations referred to above is the gradual convergence of anthropological and psycho-analytical points of view. Psycho-analysis, being from the start concerned with obviously human and individual problems, has not had the chequered career that we have seen with anthropological interpretations, nor the same opportunity and temptation to take flight into the abstract and remote. Myths, rituals, and the other data studied by the social anthropologists have in the past been read in terms of very recondite mental pursuits which were imagined to be the chief preoccupation of primitive man. I need hardly mention the engrossing interest in the forms of clouds, the rounds of the moon, the movement of the sun, the constructing of calendars, and purely linguistic exercises which have at times been supposed to prepossess mankind to the exclusion of more mundane matters. Sir James Frazer, it is true, brought man nearer to earth by positing his absorption in the phenomena of agriculture, and other workers have tracked him still nearer home. The news brought to Europe at various times in the last century that man in other continents seemed to manifest an unseemly interest in the organs and functions of sex was quickly re-interpreted in a more becoming way, and the flicker of agitation induced in this Institute by the phallicists of the seventies, Burton, Fergusson, Furlong, Jennings, King, Sellon, Staniland Wake, and Westropp, was soon quenched by more sedate reflections. But voices continued to be raised in favour of the view that man has always been moved by motives similar to those that occupy our own deepest thoughts, by the topics of birth, love, and death, and the most recent authorities in this country, such as Elliot Smith, Malinowski, Perry, and Rivers, have made considerable contributions to what may be called the humanization of primitive man. This theme will take up the greater part of my paper this evening, so that I can leave it for a moment at this point.

I have now to return from these reflections on anthropology to consider more closely the subject of psycho-analysis, but before I can indicate any of the bearings it may have on anthropological studies it will obviously be desirable to say something about psycho-analysis itself.¹ The name is properly applied to the special method devised by Freud for investigating the deeper regions of the mind, and to the findings thus made. The subject-matter of psycho-analysis is quite exceptionally complex, and thus the task of presenting any adequate account of it in the ten minutes or so at my disposal for the purpose is clearly an impossible one. In addition, there is an even greater difficulty in the way than this merely quantitative consideration.

¹ The literature in English most apposite in the present connection is as follows: Abraham, *Dreams and Myths*; Ferenczi, *Contributions to Psycho-Analysis*; Freud, *Introductory Lectures on Psycho-Analysis*, and *Taboo and Totem*; Ernest Jones, *Papers on Psycho-Analysis*, and (more advanced) *Essays on Applied Psycho-Analysis*; Rank, *The Myth of the Birth of the Hero*; Rank and Sachs, *The Significance of Psycho-Analysis for the Mental Sciences*.

The most significant discovery made by psycho-analysis is that there exists in the human mind a region, known as the "unconscious," which is split off from consciousness. Much of it, indeed the most important part, is in what is technically called a state of "repression": that is, as regards both content and form it is incompatible with the conscious mind, its constituents are powerfully inhibited from entering the latter, and its very existence is vehemently denied by the conscious ego. Any attempt at introducing them into consciousness evokes an instinctive resistance which manifests itself as incredulity, violent opposition, or strong antipathy. Those who follow the easy path of yielding to this instinctive resistance spare themselves a great deal of trouble, but they thereby forfeit the right to express any opinion about psycho-analysis, for this subject may well be defined as the study of the unconscious mind.

This is not the place to enter into the perfectly arid discussion of whether processes of which we are not conscious can properly be called "mental," one which in my opinion is nothing but a quarrel about words,¹ and I will therefore ask you to allow me to describe what I have to say in the only possible terminology, namely, psychological. The main point is this: Our investigations (inaugurated by Freud) shew that various processes, which can only be described in mental terms, go on in the personality without the conscious self having the very faintest idea of their existence. We call them "unconscious" because man is totally unconscious of their existence, and I wish to lay stress on the completeness of his ignorance: the subject not only has no suspicion of them, but if they were mentioned to him he would regard them as exceedingly remote and alien to himself, and would greet with incredulity or horror the possibility of their being actually vivid constituents of his own personality. In fact, I knew of no way of anyone's appreciating the reality and significance of these unconscious processes except by experiencing the analytic bringing to awareness of ideas whose existence he had never before recognised. This state of affairs raises two obvious questions: Can any generalisations be made about the nature and meaning of these unconscious processes, and if so what reason is there for thinking that such generalisations have a wide validity outside the small group of individuals actually investigated by these methods?

The answer to the first question is in the affirmative, and I propose presently to relate a selection of the generalisations that have been made. As to the second question, the following are some of the reasons for believing that these generalisations possess a wide validity outside the sphere—that of neurotic disorder—in connection with which they were originally made. Though the actual number of individuals thoroughly investigated by means of psycho-analysis is relatively small, only a few thousand, yet certain features warrant the expectation that they do not differ from the rest of mankind in fundamental structure. In the first place, the investigations have been made, with a general uniformity of result, in many countries

¹ See Freud, *Das Unbewusste*, Sammlung Kleiner Schriften, 4e Folge, 1918, S. 294-301.

of three continents, among widely differing races, and by very different types of observer. The main selecting element has been the presence of neurotic disorder in the majority, though by no means all, of the persons investigated, but in estimating this fact certain popular misconceptions have to be borne in mind. Modern clinical psychology has shown that neurotic disorder is not a disease or defect in the ordinary sense, but on the contrary simply one particular mode of expression of certain social difficulties and conflicts arising within the emotional and instinctual life: they are merely one way among several of responding to human conflicts and impulses of a kind that are common to all people. The reactions are not even very peculiar, being merely magnifications of the normal and not qualitatively different: apart from the fact that most people exhibit some form of neurosis, more or less pronounced, these neurotic reactions fade imperceptibly into what are called character-formations and idiosyncracies. No person is entirely neurotic, so that we have the opportunity of examining in the same person both normal and neurotic reactions to the same conflicts and impulses. Further, the control experiment has been performed a good number of times of carrying out a psycho-analysis on so-called normal people, and the fundamental conclusions are just the same. Then, again, once one is familiar with the manifestations of unconscious activity, one observes other indications of similar processes in the most various spheres of everyday life. Let me take the simplest example. A psychologist may discover, perhaps to his great astonishment, that the dreams of his patients shew that they, without ever having been consciously aware of the fact, have associated, for instance, the ideas of penis and banana so closely that the idea of the latter can in certain contexts be treated as quite equivalent to the latter. He is thus no longer surprised when he observes that, again given a certain context, a whole music-hall audience can consciously recognise an allusion to the first idea when the second alone is mentioned. Slang, anecdotes, folk-lore and superstition are fields in which one meets with special frequency associations and beliefs the existence of which may have to be laboriously excavated from a part of the mind where they are in a state of repression. The final answer to the question raised above, however, lies in the nature of the findings themselves. These are of such a fundamental character that, roughly speaking, *they can only be true of mankind in general or else not true at all*. If a similar question had been put to Harvey: "You have demonstrated the circulation of the blood by a detailed examination of five thousand people, but how do you know that they are not all exceptions in this respect?" I imagine he would have answered such a question only by shrugging his shoulders.

Something must now be said about the nature of the unconscious mind. It possesses quite peculiar features in both its form and its content, though these need not, of course, be present with every single unconscious process. Common to all features is some indication of their belonging to a primitive mental level, and here comes in the importance of these studies for anthropology, for we have in them one of the possibilities of ascertaining at first hand what primitive mental levels really

are. The term "primitive level" is used here in two senses: first, as indicating an earlier and more lowly stage in mental evolution, one out of which further, more elaborate and more highly differentiated forms of thought demonstrably develop; and, secondly, in direct reference to individual growth. For we find that the features in question, both those of form and of content, approximate in kind far more nearly to those of infantile mental life than to those characteristic of adult life; in fact, we are frequently in a position to trace the gradual development of the former into the latter. This evolution has been an imperfect one in the case of the neuroses, so that we often connect neurotic reactions with what are called "fixations" or excessive attachment to primitive, *i.e.* infantile, modes of mental functioning. Put in a more figurative way, we may say that the neurotic reactions are like residues or deposits from earlier times, and the interesting question arises how far this may be true phylogenetically as well as ontogenetically.

It was pointed out above that the unconscious mind is unconscious, *i.e.* unknown to consciousness, mainly because of its being in a state of repression, that is, of being incompatible with the conscious ego and intolerable to it. To describe it in more dynamic terms: the relationship between the two mental systems is the expression of serious intrapsychical conflicts. Now the importance of the unconscious in actual life is not merely that it is a system of the mind which can function in an autonomous way, but that *all* mental functioning originates in it: all our thoughts, interests, and conscious impulses leading to conduct have their source in the unconscious. The conscious mind contributes nothing beyond criticism, control and direction; the part it plays is essentially obstructive. Unconscious processes can come to external expression only under one of two conditions: either they undergo a transformation of such a kind as to render them acceptable to the conscious ego, into which they are then assimilated; or their true nature is disguised in certain characteristic ways, such as, for instance, when unavowed personal feelings find a vent in excessive acerbity under the guise of scientific criticism. Neurotic symptoms, incidentally, belong entirely to the second class: the dynamic impulses giving rise to them are primitive, *i.e.* untransformed, and merely disguised.

Out of a large number of features characteristic of the unconscious I now propose to call your attention to two or three of a general, formal nature and two or three relating to its content. The first one can perhaps best be described as an attitude of excessive belief in the value and significance of psychical processes in general. Psychical causation is felt to be more real than physical causation, the latter being merely the agent of the former. This registers itself most clearly in what is called belief in the "omnipotence of thought," or, more accurately, of wishes. In the unconscious, little distinction is drawn between intention and the carrying out of the act; intent and performance are treated as identical. If the intention is pleasurable, the pleasure is already tasted: for the wish passes immediately into fulfilment, as to some extent it can in conscious phantasy. Similarly, if the intention is dangerous

or reprehensible, the punishment is already felt. Perhaps the most striking example of this mode of thought is that of those death wishes that are in a state of repression because of their being directed against a loved object. On the occasions when the imaginary fulfilment of this wish coincides with a real fulfilment brought about by some accident in the outer world, the person feels unconsciously just as responsible for the death, and just as guilty, as though he had actually committed murder. The effect in consciousness then is a greatly exaggerated sense of self-reproach for various minor sins of omission and commission relating to the deceased person. I have several times known this state of affairs to be followed by ghostly visitations accompanied by acute dread of the ghost's hostility, this evidently being an idea of retribution for the supposed murder.

These repressed but all-powerful wishes are dealt with in many different ways, of which one only will be mentioned here. On the basis of a preliminary identification, usually with a person, but occasionally with an animal or inanimate object, the wishes are "projected" outwards and then are *consciously* believed to belong only to the other person. The most glaring example of this is, of course, in the delusions of the insane, where the irrational beliefs held about other people can often be traced to unconscious beliefs held by the subject about these same people.

One result of this unconscious over-estimation of the power of thought is a tendency to ascribe external happenings to spiritual forces and to depreciate the significance of physical factors, just as a truly religious man must logically ascribe everything immediately to God's will and has only a limited interest in the rest of the causative chain. Its consummation is a perfectly animistic state of mind, of which we see plain traces in our children when they get angry with the table for being so wicked as to injure them.

Now I feel confident that what I have just been relating will sound a good deal less novel to anthropologists familiar with savage races than it does to the average European. Case after case could be quoted from the literature where savages have held one another just as responsible for their intentions as for their deeds, and on reading the descriptions given I for one cannot avoid the impression that they must at times possess a high capacity for divining the unconscious thoughts of their neighbours. Their judgements are therefore often psychologically accurate, even when objectively unjust. The extraordinarily objective significance they often attach to dream processes is a part of the same phenomenon and, as Freud has shewn,¹ it really underlies the whole of the practice of magic. It seems clear that savages live to a much greater extent than we do in a mystical or supernatural world. They constantly manifest beliefs in various occult forces, influences and activities that are imperceptible to sense, but which are nevertheless obviously and unquestionably real to them; this is not a matter of inference and explanation so much as direct

¹ Freud, *Totem und Tabu*, 1913, Ch. III.

intuition. It is practically certain that many of these supposed purposive agents in the outer world are projections from the unconscious mind. The remarkable extent to which savages seem to be preoccupied with thoughts about wizardry, witchcraft, and evil spirits of all kinds inevitably makes a psycho-analyst suspect that their unconscious minds must contain specially intense wishes of a hostile nature, which have been extensively projected into the outer world.

A word on the vexed question of symbolism in its relation to the unconscious.¹ It can often be observed that in certain circumstances various ideas or objects may be treated identically in consciousness, the points of distinction between them being ignored for the time being, and just the same is true of the unconscious. But a further process has to take place before we can speak of true symbolism. That is the repression of one member of the equation, and the substitutive use of the other member to "symbolise," i.e. carry the significance of, the first. One half of this equation is practically always more important psychically than the other, the important one being the repressed and symbolised part. From the nature of things, therefore, symbolism is a unilateral process only: A can symbolise B, but B cannot symbolise A. Almost all unconscious symbolism is confined to the themes of birth, love and death, and to thoughts about the body and the nearest relatives—from which we infer that these must comprise the fundamental interests of mankind.

The two groups of ideas I shall select from the content of the unconscious are those relating to incest and death respectively. Perhaps the most vital discovery made by psycho-analysis, and certainly the source of most of the hostility it has met, was that every young child passes through a phase of incestuous attachment, mostly to the parent of the opposite sex, and that the ideas relating to this constitute throughout life a nuclear content of the unconscious. To the individual's reaction to this "complex" they would ascribe a very great part of his character-formation, especially on the moral and social side, and very many of his conscious reactions to life—his interest, conduct, and so on. To put the matter in its crudest terms so that there may be no misapprehension, we believe that every man cherishes in his unconscious the wish for sexual intimacy with his mother and the desire to remove by death any disturbing rival, particularly his father; the converse applies equally to the woman, the term "Œdipus complex" being used in both cases. Such a statement, abhorrent as it must sound, is nevertheless the core of psycho-analysis and inseparable from it. For the evidence in support of this apparently grotesque hypothesis I can only refer you to the extensive psycho-analytical literature dealing with it, nor could I have any hope of demonstrating its truth and convincing you of it in the few minutes at my disposal. My reason for mentioning it here at all is to point out that, if it is true, it is bound to throw a flood of light on some of the most obscure problems in anthropology. To take but one of them: the almost

¹ See my essay on the "Theory of Symbolism," reprinted in *Papers on Psycho-analysis*, Third Edition, 1923.

universal horror of incest, and the extraordinarily complicated and fierce laws that have been devised in the most varied parts of the world with the object of preventing it. It is well-known that previous explanations of this have proved most unsatisfactory, and no one has answered Frazer's¹ convincing argument that laws of this order are made only for crimes towards which a strong and widespread temptation exists. The argument ends in a *non possumus*: incest could not be forbidden so stringently unless there were a general inclination towards it; but the laws do exist and there is no inclination. Psycho-analysis, on the other hand, points out that the strong and universal inclination towards incest, which is logically implied in the argument, does really exist, only that for the most part it is repressed in the unconscious; it is an inclination of which we are mostly quite unaware, but it is none the less real and important. Time forbids me to enter on the endless ramifications that lead from this idea, but anthropologists know how numerous and important are the problems that relate, directly or indirectly, to incest. I can do no more than mention one or two: the endless initiation rites and ceremonies of both savage and civilised races;² the numerous myths and cosmogonies where the content is either openly or symbolically incestuous, and the vast problems of totemism itself.³

The second group of ideas in the unconscious of which I wish to say something, namely, those relating to death, will be discussed presently in connection with some current anthropological views. After this absurdly imperfect sketch of the psycho-analytical theory we must turn to the bearing of it on anthropological problems, and here too I can offer only the briefest of outlines.

It is an easily made observation that the ire of anthropologists is almost as readily aroused by the assertion that savages cannot be compared with children as by the opposite one that they can be so compared. Similarly, one invites contradiction by maintaining either that a vast gulf exists between savages and ourselves, or that there is no appreciable difference between us. I trust, therefore, that I shall be striking a peaceful note when I suggest that there is truth in all of the four statements, though a more profound truth than is sometimes recognised. The reason why this diplomatic attitude is possible is because the psycho-analytical view of both children and civilised adults differs in some important respects from the usual one. We find, on the one hand, that the two modes of thought that for present purposes may be called infantile and adult respectively—corresponding roughly with unconscious and conscious thinking—differ from each other very profoundly indeed, far more so than might ordinarily be imagined: but on the other hand that children and adults manifest the two modes of thought in no very dissimilar measure. Thus there is more of the infant in the adult than is commonly recognised, and also more of the adult in the child. Or, to put it in another way, there are enormous differences, but these

¹ Frazer, *Totemism and Exogamy*, Vol. IV, p. 97.

² See Reik, *Problems of Religious Psychology*, Ch. III.

³ See Freud, *op. cit.*, Ch. IV, and a forthcoming work on the subject by Roheim.

are not so much between child and adult as between two modes of thinking which are present in both. Stated in terms of values, this results in a greater respect for the mind of the child and a less respect for that of the adult.

Now I surmise that very much the same may prove to be true as regards the relationship between savage and civilised peoples. If so, this would mean two things. First, that much of the supposed deficiency of primitive peoples in such functions as concentration, reason, powers of discrimination and logic, and so on, is not due to the lack of these qualities so much as to a different orientation of emotional interest from our own, as Hocart¹ has brilliantly demonstrated in his study of the Fijian language: recognition of this would lead to a greater approximation of the savage mind to our own. Secondly, however, the difference between primitive emotional thinking and logical reason uninfluenced by subjective factors must be regarded as very great, and it is quite possible that there is a quantitative difference between savages and civilised peoples in this respect, just as there is after all between children and adults. In other words, it is possible that the conscious thinking of savages is more directly and extensively influenced by unconscious factors than is that of civilised peoples, just as is so with the child. In making this suggestion I wish to guard myself against the charge of underestimating the complexity of the relationship in question. Naturally there is no thought of mental evolution having progressed in a uniform and orderly manner, without any retrogressions and other complications, nor do I imagine that there is anything more than the very grossest correspondence between this evolution and the ethnological grading that may be effected in regard to the present races of mankind.

I come next to the convergence of psycho-analytical and modern anthropological views to which reference was made earlier in this paper. The most important point of correspondence is the tendency in both cases to interpret data in terms of purely human and self-centred motives of a kind which critics might dub materialistic. Few anthropologists to-day would expect savages to be primarily concerned either with ethical abstractions or with lofty philosophical speculations about the universe. Those who used to imagine this did not recognise the more lowly nature and origin of their own interests. The primitive interests of mankind lie nearer home, in his own breast, and that must be as true of the savage as psycho-analysis has shewn it to be of ourselves. Man is primarily concerned with his immediate personal interests: to these everything else is really secondary. The world is originally viewed from within out, and our inmost thoughts and interests are projected on to it as on a vast screen. Elliot Smith, for instance, declares the *leit motif* of man's civilisation to be his desire for continuous self-preservation, in both this life and the next, and he holds that from the search for the various objects which were supposed to ensure this resulted much of man's cultural endeavour. This view will be con-

¹ Hocart, "The Psychological Interpretation of Language," *Brit. Journal of Psychology*, 1913, Vol. V.

sidered more closely in a moment, and I only wish to remark here on its agreement with the psycho-analytical theory in attaching importance to the more human, personal, and indeed egocentric motives as being the fundamental ones. His tremendous generalisation, further, that "all the beliefs of primitive man concerning the nature of life can ultimately be referred back to the story of his own origin, his birth or creation,"¹ is one that would meet with extensive support from the side of psycho-analysis and is quite on the lines of a recent important study by Otto Rank.²

Another field in which the convergence of conclusions is very striking in many ways is that of symbolism, and I venture to think that the correspondence would be even closer were it not for the confusion that exists about what actually constitutes symbolism. For us the expression denotes the process whereby one idea is used (mostly unwittingly) as a substitute for an unconscious idea. The number of unconscious ideas is relatively small, far smaller than that of the symbolising ideas. From the interpretation side the two questions are: when is a given idea being used symbolically? a matter that cannot be gone into here: and which unconscious idea or ideas is it symbolising? It should be remembered that none of the psycho-analytical conclusions about symbols and the interpretation of them were derived from familiarity with anthropological data, but from laborious studies carried out on individuals. The circumstance makes the correspondence with anthropological data especially interesting. I can give here only a few examples of this, and for the sake of uniformity will choose them from the writings of two members of the same school, Elliot Smith and W. J. Perry. Psycho-analysts have long remarked that objects possessing a fancied resemblance to the female pudenda, as cowry shells are supposed to, can function as symbols of the latter. Elliot Smith³ quotes two eighteenth-century writers, Rumphius and Adanson, who pointed out this attribute of cowries, and comes to the conclusion that the whole of the complex shell-cult was based on this circumstance. The cowry, being thus a symbol of the female pudenda, became endowed with various life-giving powers. But Elliot Smith has made two further steps in this connection, both on purely psycho-analytic lines. A common mode of unconscious representation is by the mechanism known as *pars pro toto*, when a part is used to represent the whole, as with an allusion. A much more curious one is the exact opposite of this, when the whole is used to represent a part, such as when a little man appears in a dream as a symbol of the male organ itself, or a woman as a symbol of the female organ. Now, Elliot Smith, after pointing⁴ out how the cowry "came to be identified with, or regarded as, the mother and

¹ Elliot Smith, *The Evolution of the Dragon*, 1919, p. 45.

² Otto Rank, *Das Trauma der Geburt*, 1924.

³ Elliot Smith, Introduction to Wilfred Jackson's *Shells as Evidence of the Migrations of Early Culture*, 1917, p. 111.

⁴ Elliot Smith, *The Evolution of the Dragon*, p. 26.

creator of the human family," then becoming personified in the figure of the Great Mother Goddess, states it as a fact that this "Great Mother was nothing more than the cowry shell."¹ We should describe this same fact by saying that the Goddess was here functioning as a symbol of the womb, or, put in another way, that the only interest in the Great Mother *in this particular context* resided in her genital organ. Thirdly, in just the same sense as I insisted above that unconscious association was really actual identification, he writes:² "The cowry was not merely an amulet to increase fertility: it was itself the actual parent of mankind, the creator of all living things." The identification of the Mother Pot with the Great Mother, or rather with her womb, is a similar example of what we mean by true symbolism, and Elliot Smith points out some of its extraordinary ramifications: "At first, it was merely a jug of water or a basket of figs, but elsewhere it became a witch's cauldron, the magic cup, the Holy Grail, the font in which a child is reborn into the faith, the vessel of water here being interpreted in the earliest sense as the uterus or the organ of birth."³ Yet another familiar group of symbols in psycho-analytical work is a portal, door, or gateway as unconscious representatives of the vaginal opening, and here also Elliot Smith⁴ is in full accord with us. One of the most recent discoveries in our field is that the spider or octopus may function as a symbol for the Mother,⁵ but I find that Elliot Smith had already independently pointed this out, though the way he suggests the symbolism arose⁶ (cowry—Red Sea "spider shell"—octopus) is assuredly not the only one possible, unless we are to suppose that our patients have all inherited memories of their ancestors' sojourn by the Red Sea.

An unexpected psycho-analytic finding was that animals, in dreams or neurotic symptoms, most often symbolise one or other parent or else children, and that the thoughts to do with them were often connected with ideas about birth. Perry⁷ tells us that in Egypt "the cow was regarded as a form of the Great Mother, because she feeds children with her milk": and, of course, endless similar examples could be quoted from mythology and folk-lore. This one discovery opens up a large chapter in anthropology, particularly in relation to totemism, as Freud⁸ has shewn in detail.

Another remarkable discovery of psycho-analysis was that every individual passes in early life through a phase of bisexuality, and that the unconscious always retains important traces of this stage in development. This means that, although the masculine and feminine principles can be fairly clearly differentiated, neither

¹ *Idem, op. cit.*, p. 216.

² *Idem, op. cit.*, p. 151.

³ *Idem, op. cit.*, p. 151.

⁴ *Idem, op. cit.*, p. 188.

⁵ Abraham, "The Spider as a Dream Symbol," *Internat. Journ. of Psycho-Analysis*, 1923, Vol. IV, p. 313.

⁶ Elliot Smith, *op. cit.*, p. 169.

⁷ Perry, *The Origin of Magic and Religion*, 1923, p. 19.

⁸ Freud, *ibid.*

of them is anything like so definitely confined to the appropriate sex as is commonly thought. The unconscious not only interchanges the two sexes with an astonishing freedom, but other curious traces are left of the primitive attitude towards sex.¹ Ample evidences of the same free interchange are to be found in anthropological data. A characteristic bisexual symbol may be mentioned in this connection, that of water. We find that water plays a very extensive part in dream symbolism, and other products of the unconscious, in connection with ideas of birth.² and that it plays the same part here as the amniotic fluid does in reality. From Elliot Smith³ we hear that in Ancient Egypt "a bowl of water became the symbol of the fruitfulness of woman."⁴ Such symbolism implied that woman, or her uterus, was a receptacle into which the seminal fluid was poured and from which a new being emerged in a flood of amniotic fluid," and he adds elsewhere⁵ that water became an essential part of any act of ritual (*i.e.* symbolic) rebirth. He points out further⁶ the womb origin of the Mother Pot conception, and that a bowl of water was the hieroglyphic sign for the female principle in the words for vulva and woman. On the other hand, we find in psycho-analysis that water, rain, &c., are also common unconscious symbols for the male fertilising fluid, whether this is regarded as semen or, in infantile language, as urine. Perry⁷ tells us that Osiris differed from the Mother Goddesses in one important particular, namely, that he presided over irrigation, and Elliot Smith⁸ says that it is not surprising in consequence that Osiris "should have had phallic attributes, and in himself have personified the virile powers of fertilization": he also comments⁹ on the equivalency of the ideas of spilling water on or irrigating the earth and the act of coition. As is well known, ideas concerning water constituted one of the respects in which the attributes of the Egyptian Gods and Goddesses respectively became extraordinarily confounded one with the other, and I would suggest that this process was greatly facilitated by the existence of a primitive stage of bisexuality.

An interesting relic of this stage is derived from the primitive belief that women, particularly the Mother, are similar anatomically to men, and that there is no noteworthy difference between the clitoris and the penis. This idea plays a huge part in the psychology of neurotic disorder in both sexes, and is one of the sources of the dread of the "terrible Mother," which may of course exist side by side with profound

¹ This word is used here in a narrower sense than "sexuality."

² The late Dr. Rivers (*Folk-Lore*, 1922, Vol. XXXIII, p. 20 *et seq.*) showed considerable misconception of the psycho-analytic views on this point in his unsuccessful attempt to controvert them.

³ Elliot Smith, *op. cit.*, p. 152.

⁴ In my opinion, it would be more accurate to say here that it was a symbol of the pregnant womb and was only a metaphor for the idea of fruitfulness.

⁵ *Idem*, *op. cit.*, p. 33.

⁶ *Idem*, *op. cit.*, pp. 178, 182, 183.

⁷ Perry, *op. cit.*, p. 28.

⁸ Elliot Smith, *op. cit.*, p. 30.

⁹ *Idem*, *op. cit.*, pp. 28, 29.

affection. This plays also an extensive part in mythology, as witness the many portals with phallic emblems, the male attributes ascribed to Mother Goddesses in Egypt and elsewhere (uraeus, vulture, papyrus, &c.) and, as Freud has shewn,¹ it is the ultimate basis of the wide-spread taboo of virginity.

I come finally to the famous "self-preservation" theory of the modern British school of ethnology, and will begin by quoting a discerning passage from Elliot Smith,² who I understand is the author of the theory: "The interpretation of ancient texts and the study of the beliefs of less cultured modern peoples indicate that our expressions: 'to give birth,' 'to give life,' 'to maintain life,' 'to ward off death,' 'to insure good luck,' 'to prolong life,' 'to give life to the dead,' 'to animate a corpse or a representation of the dead,' 'to give fertility,' 'to impregnate,' 'to create,' represent a series of specializations of meaning which were not clearly differentiated the one from the other in early times or among relatively primitive modern people." Now I would submit that this vagueness and imperfect differentiation relate rather to the conscious apprehension and expression of these peoples than to the facts themselves on which the ideas were based, so that it may not be a hopeless task for us to attempt to distinguish the relative strength of the actual motivating forces. If we were to ask the authors and supporters of the self-preservation theory to effect this differentiation, I am inclined to think that their answer could be summed up in the statement that the strongest motive in the group they are considering, or possibly even in all mankind, was the wish to overcome death. This includes both the desire to ward off death (*i.e.* to prolong life, to maintain life, &c.) and the desire to perpetuate life beyond the grave, which, as we know, was effected by a ritual of rebirth (the central idea of mummification). We have thus to inquire into the primordial conception of death and life after death, and here also I will take a passage from Elliot Smith³ as a text. "From statements in the earliest literature that have come down to us from antiquity, no less than from the views that still prevail among the relatively more primitive peoples of the present day, it is clear that originally man did not consciously formulate a belief in immortality. It was rather the result of a defect of thinking, or as the modern psychologist would express it, an instinctive repression of the unpleasant idea that death would come to him personally, that primitive man refused to contemplate or to entertain the possibility of life coming to an end. So intense was his instinctive love of life and dread of such physical damage as would destroy his body that man unconsciously avoided thinking of the chance of his own death: hence his belief in the continuance of life cannot be regarded as the outcome of an active process of constructive thought. . . . It would, of course, be absurd to pretend that any people could fail to recognise the reality of death in the great majority of cases,

¹ Freud, *Das Tabu der Virginität*, Sammlung kleiner Schriften, 4e Folge, 1918.

² Elliot Smith, *op. cit.*, p. 25.

³ *Idem*, *op. cit.*, pp. 145, 146.

The mere fact of burial is an indication of this. But the point of difference between the views of these early men and ourselves was the tacit assumption on the part of the former that in spite of the obvious changes in his body (which made inhumation or some other procedure necessary) the deceased was still continuing an existence not unlike that which he enjoyed previously, only somewhat duller, less eventful and more precarious. He still needed food and drink, as he did before, and all the paraphernalia of his mortal life, but he was dependent upon his relatives for the maintenance of his existence."

There are two chapters in this matter of preserving life after death, according to whether it is a question of our own life or someone else's. The latter part of the problem appears to have been unduly subordinated by the British school of ethnology, and for that reason I will omit discussion of it here. But I would express my belief that it is highly important, and that a clue to its meaning is given by the fact that the significance attached to the second person's survival is much greater when he is a king, chief, elder or other great person¹ (*i.e.* a father substitute).² We will therefore confine ourselves to the problem of what may be called self-survival, which is an integral part of the self-preservation theory.

To those who have followed the argument of this paper so far it may be of interest to hear what ideas concerning death are to be found in the unconscious. In one sense it may be said that there are none, for the unconscious conceives of this idea in quite a different way from the conscious mind. The nearest approach it makes to the latter is when it is a matter of other people's death. This it regards, as does the child, simply in the light of a removal or absence, more or less prolonged, the question of eternity hardly entering in. One's own death, on the other hand, in the sense of the extermination of life, is absolutely inconceivable to the unconscious, and, indeed, the idea is hard fully to realise in consciousness. In the context where one would expect it to occur one of two other ideas appear in its stead. In the first place, the idea of dying—really of being killed—may be taken in the sense of being severely injured in a vital part, *i.e.* castrated, and this idea of being castrated (in either sex) is always regarded as the punishment for incestuous wishes. The second, and deeper, way in which the unconscious regards death is as a reversal of the birth act, leading to a return to the pre-natal existence within the maternal womb. It is plain that this must have relation to the innumerable rituals or rebirth symbolism, both in heathen religions and in Christianity, as the sovereign measure for conquering death and securing immortality: endless myths and folk beliefs, which I have no time to quote here, bear witness to this primitive conception of death as a return to the womb, to the conviction that life can only return to the bourne whence it set forth.

¹ See Freud, *Totem and Tabu*, Ch. II.

² This is an illustration of the quite one-sided nature of the argument in the latter part of this paper, for it deals only with the individual's relation to the Mother and omits consideration of the almost equally important relation to the Father.

Both the ideas mentioned, therefore, are related to the act of entering once more through the maternal portal, whether partly, as in coitus,¹ or wholly, as at birth. It is noteworthy, further, that these two acts are regarded as equivalents by the unconscious, another example of the extraordinary extent to which it differs from our conscious thinking.

If our findings are correct, and no one qualified by personal investigation has any doubt on the matter, then we should be in a position to supplement the self-preservation theory in a number of important respects, of which I shall briefly indicate three. The first has to do with the maternal symbols used in the ritual of rebirth. I imagine that Elliot Smith and his colleagues would be inclined to regard these somewhat as follows. Believing that the womb was either the creator or, at all events, the source of life, the ancients effected an abstraction of the idea and used various tokens possessing some resemblance to the female pudenda as representatives of this abstract idea. They would present these to the dead body as much as to say : " This is the sort of thing that will enable you to achieve rebirth and continued existence." To us, on the contrary, the symbolism is much more literal and concrete. The metaphorical and abstract side of it is purely secondary and conscious, and the real meaning is much more definite. The cowry, to take this example, is not merely an emblem of creativeness in general, or of wombs or Mother Goddesses in general, but is a symbol of the actual womb of the mother of the individual dead person, and the sense of the ritual is as follows : " As you know in your deepest heart, the only hope of attaining immortality is to penetrate into the Valley of the Shadow of Death, to pass once more through the portals of your mother's womb, to undergo a second birth that will annul the effects of the first² and will thus enable you to re-enter Paradise : here is her womb."

In the second place, we can throw further light on the fact that for the re-animation of the Egyptian corpse various male symbols, both phallic and seminal (the serpent-shaped wand, the adze of the Anubis who invented mummification, libations, saliva, red ochre and other blood equivalents), are necessary in addition to the female ones discussed above. It may be correlated with the astonishing fact mentioned previously, that in the unconscious the two ideas of sexual union (particularly incest) and of re-birth (*i.e.* return to the mother's womb) are regarded as equivalents : the distinction is hardly drawn between the whole person entering the mother's body or only that part of him known in legal phraseology as his " person," *i.e.* penis. In this way it comes about that (re-)birth and coitus are equivalent ideas when the

¹ In the woman this idea is replaced by that of incorporating the father in the act of sexual union, so that she becomes permanently pregnant, this being equated to being in the mother's womb by the familiar mechanism of reversal.

² Rebirth is really de-birth. The symbolism is an example of the mechanism of reversal, and really means passing into the womb instead of out of it ; it thus annuls the original birth.

Recently this symbolism of the return to Mother Earth was portrayed by Thomas Hardy

object is the mother, and it is thus comprehensible that rituals symbolising either of these acts have the power of restoring life. This is also the reason why bisexual symbols, notably water, play such a prominent part in these rituals, for they are connected with the ideas of both coitus and birth. Here, as so often, we may fall back on Elliot Smith¹ in support of our conclusions: "The study of folk-lore and early beliefs makes it abundantly clear that in the distant past which I am now discussing no clear distinction was made between fertilization and vitalization, between bringing new life into being and reanimating the body which had once been alive. The process of fertilization of the female and animating a corpse or a statue were regarded as belonging to the same category of biological processes. The sculptor who carved the portrait-statues for the Egyptian's tomb was called *sa'ukh*, "he who causes to live," and "the word 'to fashion' (*ms*) a statue is to all appearances identical with *ms*, 'to give birth.'"

with a quite final precision and delicacy in his poem on the death of Sir Frederick Treves, and I cannot refrain from quoting it here.

IN THE EVENING.

(Dorchester Cemetery.)

In the evening, shortly after he was dead,
He lay amid the dust and hoar
Of ages, and to a spirit attending said,
"This chalky bed?—
I seem to have been here before?"
"O yes. You *have* been here. You knew the place."
The sprite replied, "long ere your call;
And if you cared to do so you might trace
In this white space
Your quality, your substance, and your all."
Thereat he said: "Why was I called away?
I felt no trouble or discontent.
Why did I not prolong my ancient stay
Herein for aye?"
The sprite looked vague. "None knows! You went.
"True, Time has not as yet revealed to you
Your need to go. But, some men tell,
A marvellous deftness called you forth—to do
Much that was due.
Good. You have returned. And all is well."

Compare also Wordsworth's "Ode on the Intimations of Immortality," which expresses a similar idea: and the well-known passage from Shelley's "Adonais":—

"Life, like a dome of many-coloured glass,
Stains the white radiance of Eternity.
Until Death tramples it to fragments.—Die,
If thou wouldst be with that which thou dost seek!"

¹ Elliot Smith, *op. cit.*, p. 25.

This brings us to the elixir of life, in connection with which I shall quote the following text :¹ " In delving into the remotely distant history of our species we cannot fail to be impressed with the persistence with which, throughout the whole of his career, man (of the species *sapiens*) has been seeking for an elixir of life, to give added ' vitality ' to the dead (whose existence was not consciously regarded as ended), to prolong the days of active life to the living, to restore youth, and to protect his own life from all as-saults, not merely of time, but also of circumstance. In other words, the elixir he sought was something that would bring ' good luck ' in all the events of his life and its continuation. Most of the amulets, even of modern times, the lucky trinkets, the averters of the ' Evil Eye,' the practices and devices for securing good luck in love and sport, in curing bodily ills or mental distress, in attaining material prosperity, or a continuation of existence after death, are survivals of this ancient and persistent striving after those objects which our earliest forefathers called collectively the ' givers of life.' " Essentially, therefore, the elixir procures two desiderata : immortality in the next life and the restoration of youth in this, and I shall point out presently the intimate association between the two. Long before the era of Steinach, psycho-analysts had recognised this concern about " youth " to be a euphemism for concern about virile powers, and Abraham² and Rank³ have shown that the various magical fluids possessing the virtue of restoring it are all seminal symbols : such are the divine mead, soma, ambrosia, nectar, and so on. Now a very remarkable clinical observation bears on this double function of elixir, its powers of restoring youth on the one hand and of securing immortality on the other. When a patient consults us with the complaints that he has an undue dread of death (thanatophobia) or of the next world, that life feels to him so short and that youth is rapidly passing away, i.e. the two complaints which the elixir of life is designed to cure, then we know something about his inner mind with absolute certainty, for the analysis of such symptoms infallibly leads to the same conclusion. He is suffering from a (conscious or unconscious) dread of impotency, and this dread always comes from the fear of being castrated as a punishment for his incestuous wishes. As we have reason to think that these wishes are the main source of fear and guilt in general, and that the dread and horror of them was even stronger in primitive man, it is little wonder that the search for magic objects whose phallic or seminal attributes would counteract such terrors has played a tremendous part in the history of our race.

The third, and perhaps the most important, supplement to the self-preservation theory I would propose is that a more equal balance should be restored between the ideas of life and death. This theory would seem to be based on a somewhat morbid over-estimation of the part played by the fear of death, important as this undoubtedly

¹ *Ibid.* p. 145.

² Abraham, *op. cit.*

³ Rank : " Volkerpsychologische Parallelen zu den infantilen Sexualtheorien," reprinted in his *Psychoanalytische Beiträge zur Mythenforschung* 1919.

is. The motives we have been considering apply just as much to the positive side of life as to this negative side. The desire for unbounded virility probably plays a greater part than the desire for indefinite existence, for the latter is often taken for granted by the primitive mind, and always by the unconscious mind,¹ whereas experience is constantly placing limits on both the capacity and the exercise of the sexual functions. Clinically both dreads, of impotency and of death, always indicate the action of castration fears in relation to incestuous wishes, while the man who is not troubled by either is the man who has overcome his dread of incest.²

The two means of re-union with the mother, part or whole (penis or body), are each accompanied by corresponding horrors: the first by impotence, *i.e.* castration, and the second by having to experience once more the terrible passage of the womb canal in the transit through death to paradise. What is astounding is that the two desires are equated in the unconscious mind, as are the two horrors. Yet these two desires—or shall we decide to call them one, as the unconscious does?—are the supreme driving force of our life, and their fulfilment its final goal.

The nearest approach to the gratification of this primordial desire is achieved in a happy sexual union with a loved object, and this explains the value of this act as an affirmation of life and a denial of the horrors of castration and death. Yet this only avails in so far as the primal wish—to re-enter the womb as a whole—is exchanged for the incomplete form of union represented by coitus, and in so far as the primal love-object (the mother) can be exchanged for a permissible and accessible one. It would seem that neither of these exchanges is ever completely accomplished—at least in the unconscious—so that man is condemned to an imperfect satisfaction of his deepest desires. Hence his restless and insatiable strivings for some other substitute for his heart's desire. Hence the astonishing wanderings and explorations of the Ancient Egyptians related to us by modern ethnologists. Surely somewhere there is to be found a wonderful Isle of the Blest,³ with beautiful maidens, golden fruit, and a fountain of "youth." But there are limits to man's powers of searching in the outer world, and every few hours even he has to have recourse, in the state of sleep, to what psycho-analysis teaches us is an imaginary re-establishment of pre-natal existence.⁴ And when faced by the grim fact of death, though he may shrink

¹ Eternity is really a negative concept and simply means the timelessness so characteristic of unconscious thinking, and therefore of pre-natal existence.

² *E.g.* by transforming the desire, transferring it to another woman than his mother and satisfactorily gratifying it with her.

³ For the peculiar womb symbolism of this, see the chapter on "The Island of Ireland" in my *Essays on Applied Psycho-Analysis*, 1923. I hope to deal in a future paper with the interesting "El Dorado" theme, which Perry (*Folk-Lore*, 1921, vol. xxxii, p. 150) has shewn to be so interwoven with it.

⁴ Incidentally, here is the solution of the problem raised by Perry (*The Origin, etc., op. cit.*, p. 46) of whether the crouching position in which bodies were placed in caves is to be related to the attitude during sleep or during intra-uterine life. The answer is, to both, for the two are psychologically the same.

in fear from the thought of the painful re-birth it unconsciously symbolises, nevertheless the deepest part of his being cannot refuse the wild hope that once this final struggle is over he may, in spite of all his disappointments, enter at last into the longed-for haven (or heaven) of peace and partake yet again of the lost bliss of Nirvana.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF MALTA AND GOZO.

[WITH PLATES V—XX.]

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I.—INTRODUCTION.

THERE is perhaps no part of the earth's surface where, in an equal area, so many megalithic monuments have been revealed as in the Maltese Islands. The remains were remarked as early as the seventeenth century (1)¹ and have been visited and pictured by more than one artist (2), but it was only with the accurate work of General de la Marmora in 1832 (3) that there was any advance in the knowledge of the plan of these buildings. Since that date contributions to the subject have been made by Vance 1842 (4), Gerhard 1848 (5), Vassallo 1853 (6), Furse 1868 (7), Caruana 1882–96 (8), Magri 1906 (9), Mayr 1901 and 1909 (10), Ashby, Peet, Bradley and Tagliaferro 1908–11 (11), and Zammit 1904–23 (12). Furthermore, to the neolithic sanctuaries have now been added a series of dolmens (13) and cave dwellings (14) which probably belonged to the same period and were used by the same people. It is with objects found in the sanctuaries alone that we are here concerned.

We need not discuss the megalithic buildings in detail. It will suffice to remind the reader firstly that they are all of neolithic age, in the sense that, so far as

¹ The numbers in brackets refer to the bibliography on p. 69.

evidence goes, no metal had reached the islands at the time when they were reared, and, secondly, that they all accord with the same primarily simple architectural plan, complicated, however, by later additions and alterations. Each temple or sanctuary appears to have consisted originally of a short entrance passage on which followed two double apses which was connected by a corridor in line with the entrance passage, and terminated in a small semicircular chapel in line with the entrance and the corridor. The simplest and most typical of the temples is the Gigantia of Gozo, a plan of which will serve as an example. (See Plan, p. 70.)

No definite rule of orientation seems to have governed the construction of these buildings, but they were always built in pairs, one being larger than the other, and they were very probably roofed by corbelled arches. It is also possible that after the roof had been completed the entire building was covered over by a thick layer of earth, so that it assumed a spuriously subterranean character. When the sanctuary fell into neglect the roof would, after a time, collapse, burying the building in the debris and thus saving it from being rifled or further destroyed. It is perhaps to this custom of covering the buildings with earth that we owe the good preservation of the Maltese neolithic monuments, in spite of the softness of the stone of which they are constructed.

One of the sanctuaries with which we are concerned, the Hypogeum at Hal Saffiení, differs from the others in being truly subterranean. The architects of this structure have sought to reproduce in the living rock many of the structural features and appearances characteristic of similar works above ground.

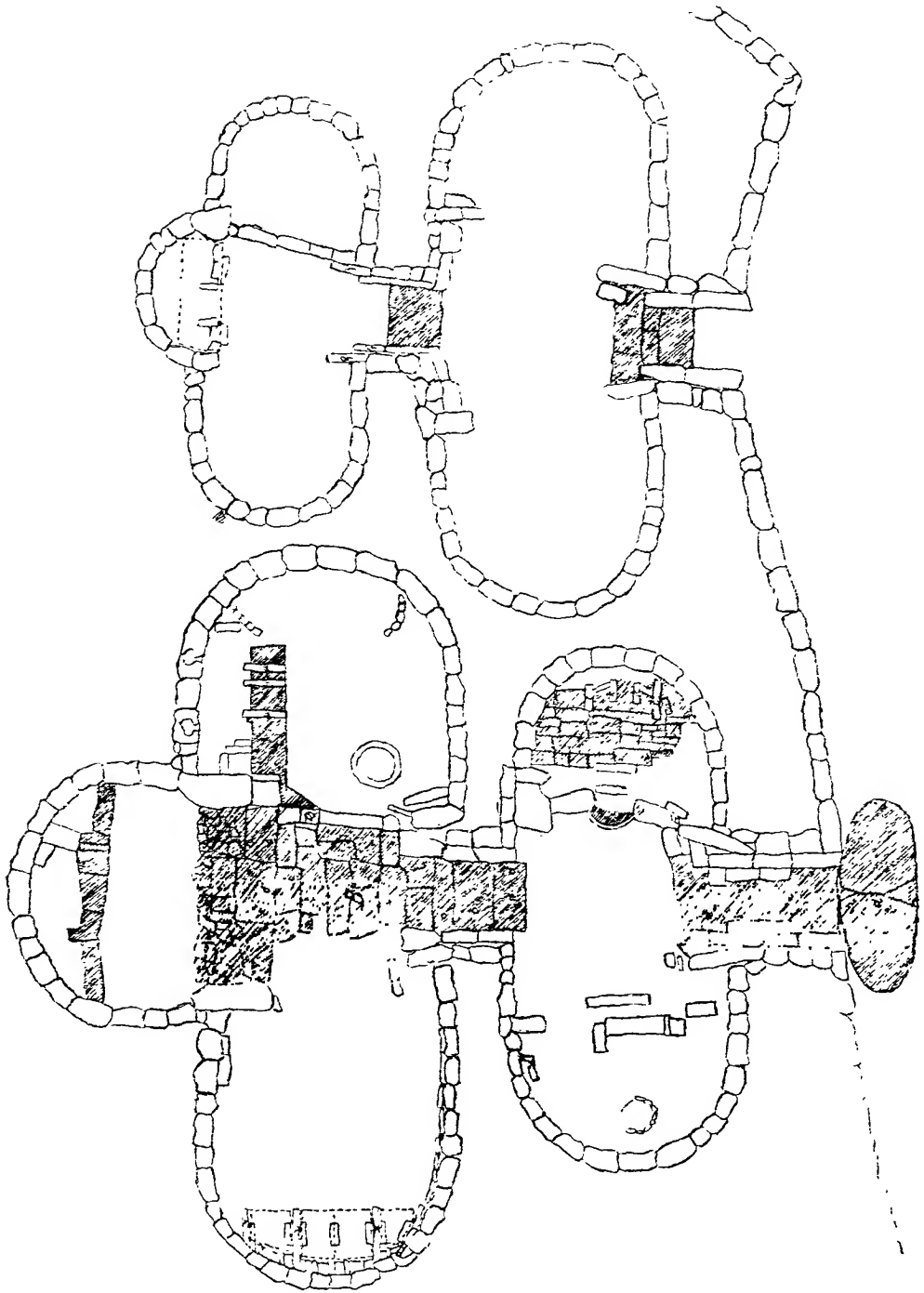
The most remarkable objects found in these neolithic sanctuaries are a series of statuettes and other representations of the human form. Notwithstanding the number, perfection and peculiarity of these figures they have as yet received little attention. None have been fully described, a number have not been previously figured, nor is there any comprehensive account of them as a group. In the following pages we have sought to describe all these neolithic Maltese representations of the human form that have so far come to light.

We have not hesitated to draw conclusions from our findings, but we have separated these from the descriptions themselves. We thus seek to place before the reader materials from which may be drawn wider generalizations than we have been able to make.

All the objects here described are now in the Valletta Museum at Malta, with the exception of objects 14, 43 (Pl. XIV), 63 and 64 (Pl. XX). Of these, objects 14 and 43, forming parts of the buildings, have been left in their places in the sanctuaries of Hagiar Kim and Tarxien respectively, while the two heads discovered at the Gigantia, and described as objects 63 and 64, are in the public library on the island of Gozo.

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- (14) Cave dwellings were discovered in Malta in 1911 and in Gozo in 1913; a number of menhirs have also been found in the island, cf. *Report of the Valletta Museum for 1914*.



GROUND PLAN OF MEGALITHIC TEMPLE, THE "GGANTJA," ON THE ISLAND OF GOZO.

(The shaded areas represent stones laid horizontally, the unshaded areas stones placed vertically.)

III.—EXCAVATION OF SITES.

The objects described by us have been derived from five sites: Hagiar Kim, Mnajdra, Hal Saflieni (Hypogeum) and Tarxien in the island of Malta and the so-called "Gigantia" in Gozo. A few lines concerning these sanctuaries will be convenient.

(a) *Hagiar Kim*.—This site has yielded the most valuable and characteristic of all the figures. Unfortunately it was explored earlier and less carefully than the others, and the record of the finds there is very imperfect.

Hagiar Kim was excavated by Vance under direction of the Maltese Government in 1839 and was described by him in 1842 in an unscientific manner. He speaks of seven large images of soft limestone (objects 1-4 and 6-8) and two of clay (objects 5 and 9), but does not tell us in what part of the building they were found. Caruana in his re-examination of the site in 1885 employed labourers who had worked for Vance nearly fifty years earlier. They pointed out to him the actual spot in one of the courts where, they said, the images had been found. In 1852 Newton secured two cart-loads of pottery from Hagiar Kim and Mnajdra,¹ but these have wholly disappeared. A villager from the neighbourhood of Hagiar Kim alleges that his father had found many more of the figures and had sold them to visitors. The site was re-excavated by Caruana in 1885, by Mayr in 1900, and by members of the British School at Rome in 1910. None of these examinations yielded further finds of human figures. In 1914, however, the caretaker of the ruins lit upon the four small objects here described as 10-13 (Pl. XIX). Object 15 (Pl. VIII) was picked up in 1922.

(b) *The Hypogeum at Hal Saflieni*.—This remarkable subterranean work was discovered accidentally in 1902. Its systematic exploration was commenced in 1904 under the direction of Magri, who died without leaving a record of his work. The excavation was continued from 1906 onwards by Zammit, who published an account of the excavations, with a plan, in a scarce report printed in Malta in 1910. The Hypogeum consists of two floors or stories. From near the centre of the upper of these a pit is sunk and in this were found the objects here described. Some of them were very briefly discussed by Zammit, Peet and Bradley in 1912, though attention had already been drawn to them by Mayr in 1909. No adequate account of them has yet appeared. The site has yielded objects 16-28.

(c) *Mnajdra*.—This sanctuary is situated about half a mile from Hagiar Kim. Mnajdra was first excavated in 1840 by Lenormant, but his description of the state of the building has not come down to us, the first plan being a rough sketch by Fergusson in 1872.² Mayr in 1900 made a better survey, which was completed by the work of Ashby and others in 1910, when object 30 was discovered.

¹ C. Newton, *Travels and Discoveries in the Levant*, vol. i, 6.

² J. Fergusson, *Rude Stone Monuments*, p. 637.

Of the sites in Malta with which we are concerned Mnajdra has yielded least material for the purpose of this paper, only five figures having been recovered from there (objects 29-34). None of the adipose figures that form so striking a feature of Maltese neolithic art have been found there, and only a single figure fully characteristic of that art (object 29, Pl. XI). All the Mnajdra figures appear to be of a votive character.

(d) *Hal Tarxien*.—The existence of this sanctuary had been suspected since 1913. It was definitely revealed in 1915 and was excavated by Zammit in that and the following years. A general description and incomplete ground plan is rendered in the *Annual Report of the Valletta Museum for 1916*. Many characteristic and valuable figures have been found at Hal Tarxien (objects 35-62), and the site may yield further treasures. Digging there still continues.¹

(e) *The Giant of Gozo*.—This magnificent monument, now greatly deteriorated, has a considerable literary history. It was known to Abela in 1647 and was beautifully pictured by Houel in 1787. It was first excavated by Mazzara in 1827, and was examined very carefully by La Marmora in 1834. The site was surveyed and described again by Mayr in 1900.

Two heads (objects 63 and 64, Pl. XX) were found by La Marmora in the terminal chapel of the larger temple. These heads are very imperfectly reproduced by him. There is a contemporary sketch by Busuttil that now rests in the Valletta Museum which is the original from which Marmora's figure was engraved (Tagliaferro Bequest 286, No. 178). At some unknown date after La Marmora, a female bust was also found and is cursorily referred to by Caruana in 1881. All three are now in the public library at Gozo, and have been briefly described by Mayr. The bust, however, is of Phœnician, not neolithic, workmanship, and we therefore do not describe it here.

IV.—MATERIALS AND WORKMANSHIP OF FIGURES.

The sixty-four objects that we here describe are wrought from the following substances :—

Materials native to the island—

Globigerina limestone	..	..	..	..	..	30 objects.
Stalactite	..	..	..	..	..	1 object.
" Soapstone " or clayey limestone	..	..	..	..	..	1 ..
Rough clay	..	..	..	..	..	19 objects.
Clay with smooth slip	..	..	..	..	..	10 ..

Materials foreign to the island—

Alabaster	..	..	..	..	..	2 objects.
White striated pebble	..	..	..	..	..	1 object.

Globigerina limestone is very common in Malta and forms a large part of its surface. If a line be drawn from Saint Paul's Bay in the north to Hagra Is-seuda in

¹ See *Archæologia*, 1916 vol. lxxv, 1917 vol. lxxviii, and 1920 vol. lxx.

the south it will be found that for most of the island east of the line the surface rock is composed of this stone interspersed with small and isolated outcrops of the lower coralline limestone. The area west of this artificial line, comprising about one-third of the island, is mainly upper coralline limestone. Between the upper coralline and the globigerina limestone a layer of clay intervenes. This clay, more or less fully baked, has been utilized by the neolithic artists. The surface of the island of Gozo is also very largely occupied by globigerina limestone, and the two neolithic objects recovered there are formed of that substance.¹ The globigerina limestone is soft, yellowish, and easily worked, and has been used also for the building of the sanctuaries. It is still the universal building material of the islands and is the usual material of the Neolithic figures.

The limestone figures are of two kinds, rough and smooth. The majority of the figures after having been accurately cut have had their surfaces carefully rubbed down by the sculptor. How accurately he was able to work may be gathered by comparing, for instance, the measurements given of objects 1 and 2, which in some dimensions accord within a millimetre. These have both been rubbed and have a smooth surface, but other figures equally carefully worked have been left rough.

The clayey limestone from which the beautiful little object numbered 36 (Pl. XI) has been made is a layer formed on the upper part of the globigerina limestone. It comes to the surface in many parts of the islands and is sometimes used by the natives for washing—hence the name “soap-stone”—and as a material for hearths and fire-places. It is remarkable that a substance so easily worked, so resistant to fire and capable of receiving such a good surface, should not have been more used by the ancient inhabitants of the islands.

Very noteworthy is the material of object 48 (Pl. XV). The artist has here worked on a natural stalactite and shaped the head from that, leaving in the rough the piece of rock from which the stalactite depended. Small stalactitic masses are frequent in Malta and Gozo.

As can be gathered from the fine pottery in the Valletta Museum, the neolithic Maltese artist was expert in the use of clay. Though some of the models we here describe are very rough, others are of excellent workmanship, polished and covered with a very fine slip.

One object, No. 50 (Pl. XV), is formed from a white striated pebble of a kind not known in the island. It seems to have been a favourite with the neolithic artist, as a

¹ An account of the geology of Malta and Gozo, with an excellent geological map, is given by J. Murray, “The Maltese Islands, with Special Reference to their Geological Structure,” in the *Scottish Geographical Magazine* for 1890, p. 449, London, 1891. This article and a number of others, by J. H. Cooke, on the Geology of Malta, are reprinted as a work *On the Geology of the Maltese Islands*, London, 1897. Earlier accounts, also with a geological map, are contained in an article by A. Leith Adams, “On the Dentition and Osteology of the Maltese Fossil Elephants,” in the *Transactions of the Zoological Society*, vol. ix, 1, London, 1874, and in his *Notes of a Naturalist in the Nile Valley and Malta*, Edinburgh, 1870.

number of objects, not in the category we are discussing, were manufactured from it. Both it and the alabaster of which objects 19 and 20 (Pls. XVII and XIX) are wrought were probably imported from Sicily. A number of tools of flint and obsidian have been found in the islands. Neither of these substances is encountered in geological deposits of Malta or Gozo. But the native neolithic workman was not necessarily entirely dependent on foreign material for suitable stone implements, as deposits both of chert and of a black and very hard limestone are found in the islands.¹

V.—GENERAL CHARACTERS OF THE FIGURES.

Most of the figures and fragments may be provisionally classified into groups according to their supposed character.

(a) Idealized representations of the human form—

Males. 1. 2. 3. 4. 5. 8. 16. 19. 20. 21. 35. 36. 37. 46. 47. 59. 62.

Females. 6. 7. 14. 22. 23. 42. 43. 44. 45. 58.

(b) Portrait models. 9. 10. 11. 12. 17. 18. 26. 31. 48. 50. 52. 60.

(c) Representations of priests or temple officials. 38. 39. 40. 41. 55. 61.

(d) Votive offerings. 13. 24. 25. 27. 28. 29. 30. 32. 33. 34. 51. 53. 54. 56.

(a) *Idealized representations of the human form.*—These are all represented as enormously stout, with vast buttocks, thighs, legs, arms and forearms, and with a chest overloaded with fat. The hands and feet are in all cases small. The males are unclothed and their chests are flat, the nipples not being represented. There is never any indication of the male generative organs. The faces are hairless in every case. Two figures which appear to be certainly female (objects 6 and 7, Pl. VI) have loose *décolleté* robes reaching to the feet. These images, male and female alike, though they are presented to us by the artist in various positions and poses, have nevertheless proportions which are strikingly alike. Furthermore, the proportions of the figures from different sites are very similar. We must suppose, therefore, that the neolithic artists of Malta had a definite standard for such representations.

But this standard by no means implied inability to represent the human form in a more life-like manner. (See especially object 9, Pl. VII, object 24, Pl. X, object 38, Pl. XII and object 53, Pl. XVIII.) Of this we may convince ourselves by examination of the portrait models and of certain of the votive offerings. In its development of what was presumably an ecclesiastical convention, distinct from the freer presentation of the human form where the idea of sanctity was not involved, the very peculiar and highly specialized art of neolithic Malta may be reasonably compared to stages in the development of many systems of representations adopted by the ancient world.

With the exception of one small alabaster figure (19, Pl. XVII), and a remarkable clay model (22, Pl. IX), no idealized image has been found with its head in

¹ See R. H. Cooke "On the Occurrence of Concretionary Masses of Flint and Chert in the Maltese Limestone," *Geological Magazine*, April, 1893, p. 157.

place. A careful examination of the figures has convinced us that some, at least, of the statues must have been provided with removable heads. Many of the images show the remains of a socket, and a number of heads have been found with a peg-like neck to fit into these sockets. There is, perhaps, an indication that the heads were made to nod as in the well-known images of Chinese mandarins. Sometimes the socket seems unnecessarily large for the neck peg. Can these cavities have been used as receptacles for small offerings?

Very remarkable is object 58 (Pl. XVI), which represents the edge or hem of a garment similar to that represented in objects 22, 38, 39, 42, 43, 44, 45 and 55. In this case there is engraved on the garment itself a series of representations of the typical fat figures of the Maltese type.

(b) *The portrait models* are, perhaps, of an offertory character. There are at least eight in the collection. Several specimens of this group are works of high skill, are fairly perfect, and are in many respects the most interesting of the collection.

The portrait model numbered in our description as 9 (Pl. VII) is a work of genuine realistic art. It renders with great faithfulness the coarse outline of a fat, unwieldy female. Anatomically it is a masterpiece. The groove between the vertical masses of spinal muscles, the flattening over the great trochanter, the impressions of the scapulæ, the prominences over the clavicle, the folds of fat behind in the region of the waist, the poise of the prominent abdomen and breasts, the outlines of the patellæ and the popliteal groove, are all rendered with accuracy and knowledge. Our first impression is that this cannot be the work of the people that depicted the impossible adiposity of the images 1-5 for instance, but such doubts are set aside by the discoveries at the Hypogeum at Hal Saflieni. Among these is a votive offering consisting of a clay model of a portion of a human figure (object 24, Pl. X) in many respects similar to 9, and rendered with equal faithfulness. Yet in its close neighbourhood were found figures (objects 16, 19, 20, 21, Pls. VIII, XVII and XIX) perhaps even more conventionalized than those described as 1-5.

Two other objects (22 and 23, Pls. IX and X), though of less artistic value than 9, are both far more life-like than the deformed images. They were found in the Hypogeum at Hal Saflieni and represent female figures lying upon a bed or couch. It is tempting to connect these two portrait models with the idea of the temple-sleep or incubation. One of them (22) represents an immensely stout woman lying on her side, her right hand and arm clasping a cubical pillow. She is naked above the waist. A little distance below the umbilicus the skirt is suspended from a broad rolled upper border and descends from there to the ankles. Above the umbilicus the body appears to be cut into by a tight girdle hidden in the folds of flesh, but indicated by an incised line around the body. Hands and feet are small.

The second object of the same type (23) has lost its head. Here the woman is lying on her face on a similar bed or couch and has a similar roll at the upper end of her petticoat. The tight girdle is not represented.

We are in doubt as to the category into which we should place these two figures. With equal appropriateness they might be classed as idealized representations or portrait models.

Object 53 (Pl. XVIII) shows a high degree of skill in modelling, with some artistic feeling. It represents a crouching nude female figure very naturalistically rendered and without the adipose development characteristic of most of the Maltese representations. The remaining objects which we class as portrait models are inferior to these in workmanship. In these, as in all other Maltese neolithic figures, the face is represented as hairless.

(c) *Representations of priests or temple officials*.—At Tarxien a part of the sanctuary is shut off from the remainder and is reached by a flight of stone steps which ascend to a platform leading to the inner rooms. There are indications that the section thus separated from the main building was put to a use different from that of the remainder. It was, perhaps, a specially holy place to which only the priest or official was in the habit of penetrating. Here were found remains of figures of a character different from that of the objects revealed in the other sanctuaries. These figures are roughly wrought of unbaked clay, but are nevertheless realistically rendered (38–41, Pls. XII and XIII). They are clothed in robes reaching from neck to feet with pleated skirts. Two heads have survived complete, but detached from the statues. There is nothing to indicate the sex of the statues themselves, but one, at least, of the heads is surely a portrait and represents a male. Remains of two or, perhaps, three of these statues have been encountered. They are hollow and possibly had removable heads like those of the sacred images.

(d) *Votive offerings*.—A number of representations of a portion of the human body have been discovered on the sites of neolithic Maltese sanctuaries. Among them are two models of legs (objects 32 and 33, Pl. XX) and one of a hand (object 13, Pl. XIX).

Three clay models which we class as votive offerings are of special interest. The first (object 24, Pl. X) we have already mentioned and have compared it with (object 9, Pl. VII). It consists of the lower half of a naked female body rendered with great skill and accuracy and with some beauty. It was made in its present truncated form, and was, perhaps, intended to be suspended as a pendant.

The other two (29, Pl. XI, and 49, Pl. XV) are torsos roughly fashioned in clay, but with a realism by no means contemptible. One was discovered at Mnajdra and the other at Tarxien, but they are so alike as to suggest that they are the work of the same artist. They are practically complete, and the absence of arms, legs and head is not due to injury. Both represent a female body with a great projecting abdomen, large breasts and very detailed treatment of the vertebrae and ribs. In both the artist has laid stress on the genitalia. The general appearance suggests that of the wasting accompanying an abdominal tumour. One of these curious figures (49) has a number of fragments of shell stuck symmetrically into different parts. Have we here to do with a work of witchcraft?

A word may here be said about the peculiar double conical holes which stud not only a number of the objects recovered from neolithic sites, but also the stones of the buildings themselves. It appears to have been a habit of the neolithic Maltese to perforate such biconical passages in objects of stones, and the act had presumably a ritual significance. Every threshold stone is bored with two conical holes connected together by a passage, and in many cases the holes have a conical cap of stone fitted into them. Often the lintels are similarly treated. On the threshold of one of the chambers in the Hypogeum one such system contained a pair of ram's horns. The lintels are always bored asymmetrically, but nevertheless early observers sometimes regarded these as sockets for the attachment of some kind of door, an inadmissible interpretation. Smaller objects frequently have similar biconical holes, and sometimes the transverse passage is so short as to leave merely a narrow bridge. There is no attempt at symmetry in the distribution of these peculiar holes, though the greatest skill is often displayed in their formation. Biconical holes may be seen, for instance, in our figures of objects 3 and 4 (Pl. I), 6 and 7 (Pl. II), 16 (Pl. VIII) and 20 (Pl. XIX).

VI.—AFFINITIES OF THE FIGURES.

The extreme adiposity with which the human figure is represented is a characteristic of neolithic Maltese art. In the case of the images or representations of deities or sacred persons, if such they be, this adiposity reaches an impossible proportion and accords to a highly conventionalized type. But, even when the artist is clearly trying to model actual human beings, the fatness of the figures is often very striking. Both sexes are similarly treated. The basic association of ideas in this mode of portrayal of the deities we may regard as the leisure and fatness which come from power and wealth and are associated with the idea of fertility.

The figures under consideration are certainly not truly *steatopygous*, though they have been frequently so regarded. The fat is represented as largely deposited in buttocks, but this is characteristic of simple obesity and is commonly encountered in very fat people. True *steatopygia* is quite consistent with a lean figure.

Obesity is a not infrequent feature in pre-historic representations of the human form. In palæolithic art it has long been recognized. Neolithic figures similarly developed have been described from Crete, the Cyclades, the Morea, Thessaly, Servia, Egypt, Erythrea and elsewhere. There are, however, certain characteristics of the Maltese figures that separate them from nearly all other forms of neolithic art except, perhaps, that of Thessaly.¹ These characteristics may be classified broadly under three heads—(a) the fatness is represented in a highly conventionalized manner; (b) it accords in certain respects with a well-known group of pathological conditions; (c) it is not confined to one sex.

¹ For similar figures from Thessaly see Χρηστός Ισουντάς *Αἱ προϊστορικοὶ ἀκροπόλεις Διμηνίου καὶ Σέσκλου* in the *Βιβλιοθήκη τῆς ἐν Αθήναις ἀρχαιολογικῆς ἐταιρείας*, Athens, 1908, especially p. 302 ff. and plates xxxi-xxxiv.

The conventional element in the treatment of the adipose development of these figures exhibits itself in numerous directions. The hands are always represented as small, out of proportion to the rest of the body, and the feet as very short and plantiflexed, suggestive of some artificial deformity. The upper arms are greatly distended, though the largest deposit of fat occurs in the lower limbs. The chest is always rather flat and the waist line usually exaggerated. The head, however, though exhibiting in some cases a rather full face, cannot be said to suggest those large deposits of fat that are usual in the very obese. There are no rolls of fat on the neck, except in Fig. 19 (Pl. XVII). The back is usually represented as straight or even concave. In all the naked figures great folds of fat conceal the genitalia, and in one of the upright models, representing a male, the pendulous abdomen hangs down like an apron.

In the smallness of the hands and feet, in the absence of adipose deposits about the head, face and neck, in the distension of the upper arms and thighs, in the waist-line accentuated by the folds of fat, and in the concealment of the genitalia by an apron-like layer of fat, these figures are in line with a group of pathological conditions associated with extreme fatness. Is it possible that with a people among whom adiposity was regarded as related to sanctity and a desirable and beautiful condition, the sporadic occurrence of one or two pathological cases might have fixed the standard for the representation of the deities?

But another line of comparison suggests itself in contemplating these figures. Taking the model of the woman on the couch (22, Pl. IX) as a type, we see here an extraordinary exaggeration of the secondary sexual characters. Without pressing any analogy with the Cretan civilization too deeply, we may claim that we have here a coarse and crude representation of that which is rendered more finely in the well-known tightly laced figures from Crete. In both we have the small waist, exaggerated bust and hips, hollow back and closely fitting skirt dependent from an upper rolled border. Whether a more detailed comparison between the arts of Malta and Crete is possible is a question for the future to answer. A first impression is that we may have in Malta a specialised and local form of an art which is well known from Crete.

We have to thank Mr. Edward Caruana Dingli, of Malta, for the pencil and pen sketches of objects which could not be photographed. Mr. Dingli's sketches are reproduced on Pls. XVII-XIX.

The figures of objects 35, 36, 38, 39, 40, 43-48 and 60 have already appeared in the pages of *Archæologia*. We have to thank the Society of Antiquaries for the use of the blocks from which these have been printed.

VII.—DESCRIPTION OF FIGURES.

(a) *Hajjar Kim*.

Objects 1-9 were found by Vance in 1839: object 14 is still *in situ* and was presumably excavated by Vance at the same date. Objects 10-13 were found in 1914. Object 14 was found in 1922.

1. (Pl. V). Headless statuette of globigerina limestone with injuries in regions of the neck, the left side of the thorax and both hands and feet. The finish of the surface is smooth. There are traces in the lower part of a red pigment. It is in a sitting posture, with the two legs folded toward the left and the hands resting placidly on the thighs. The figure represents a male: it is without clothing and the chest is flat. There are transverse abdominal creases, and the umbilicus is indicated but not the nipples. Buttocks, thighs, legs, upper arm and forearms are represented as being immensely adipose. The hands and feet are much damaged, but enough of them remains to show that they were very small, the limbs attenuating to the wrists and ankles. The position of the patellæ is indicated by a break in the folds between the thighs and legs.

Laterally the enormous size of buttocks and thighs is well shown, and two conventional folds represent the division between thigh and buttock.

Posteriorly the statuette is flattened. The back of the thorax is a plane or only slightly convex surface terminated by a well-marked waist line. The posterior surface of the buttocks is also flattened. Neither the natal nor the gluteal folds are indicated.

The under side of the statuette is an oval surface of stone which has been cut or ground, a small groove intervening between this base and the statuette itself.

Measurements :—

Extreme height	..	..	..	..	..	..	20·6 cms.
Maximum width across buttocks	..	..	..	..	..	..	25·5 ..
Extreme depth	..	..	..	..	..	..	19·8 ..
Maximum width of thorax between axillary folds behind	..	..	..	..	..	..	11·2 ..
Maximum width of thorax between axillary folds in front	..	..	..	..	..	(estimated)	10·7 ..
Maximum diameter of right upper arm	..	..	..	..	..	..	6·4 ..
.. .. forearm	..	..	..	..	..	..	4·5 ..
.. .. thigh	..	..	..	..	..	..	10·7 ..
.. .. leg	..	..	..	..	..	..	7·8 ..
Distance from right patellæ fold to ankle	..	..	..	..	..	..	9·6 ..
Circumference round buttocks	..	..	..	..	..	..	75·6 ..

(Compare with measurements of object 2.)

2. (Pl. V). Headless statuette of globigerina limestone with injuries in region of neck, left forearm, and hand and right foot. The finish of the surface is smooth. It bears the marks of having been subjected to fire. The statuette closely resembles 1, and it is in a very similar though not identical sitting posture. The legs are tucked away to the left, but both hands rest on the enormous left thigh. The representation is that of a male with flat chest, with transverse folds of the abdomen, and a slight dimple in place of the umbilicus. The nipples are not indicated. The right hand and left foot remain.

The hands are marked off from the forearms by a circular dimple. The thumb and fingers of the right hand are indicated by a series of finely cut lines: they are flexed, while those of the left rest extended on the thigh. The toes of the left foot are similarly indicated to the fingers of the right hand. The foot is plantiflexed, the sole is quite hollow.

Measurements :—

Extreme height	..	..	..	..	..	..	21.2 cms.
Maximum width across buttocks	..	..	..	..	..	..	25.4 ..
Extreme depth	..	..	..	..	..	..	19.7 ..
Maximum width of thorax between axillary folds behind	..	..	..	..	..	..	11.8 ..
.. .. ..	..	..	..	..	..	in front	10.9 ..
Maximum diameter of right upper arm	..	..	..	..	..	..	5.9 ..
.. .. forearm	..	..	..	..	..	..	4.6 ..
.. .. thigh	..	..	..	..	..	..	10.7 ..
.. .. leg	..	..	..	..	..	..	7.4 ..
Distance from right patella to ankle	..	..	..	..	..	..	9.5 ..
Circumference round buttocks	..	..	..	..	..	..	74.1 ..

3. (Pl. V). Headless male statuette of globigerina limestone with considerable injuries in regions of both shoulders, neck, hands and arms, and right leg and foot. The finish is smooth. The figure bears signs of having been subjected to fire. It closely resembles 1 and 2, but the legs are folded to the right. The right hand rests on the left thigh, and the left hand crosses behind it and conceals the umbilicus. The fingers of both hands are extended.

A socket can be traced in the neck region, into which a movable head must have fitted. This socket was pierced by a series of six holes, of which two remain complete, while traces can be discerned of the other four. These holes are all of the peculiar bi-conical character so often found in neolithic Maltese objects to which we have already referred. The bottom of the socket is irregularly excavated. The pedestal is more pronounced than in 1 and 2 and projects all round beyond the base of the figure.

Measurements :—

Extreme height	..	..	..	..	..	..	19.4 cms.
Maximum width across buttocks	..	..	..	..	..	..	24.0 ..
.. .. pedestal	..	..	..	..	..	..	25.1 ..
Extreme depth	..	..	..	..	..	..	16.7 ..
Maximum width of thorax between axillary folds behind	..	..	..	..	..	..	11.9 ..
.. .. ..	..	..	..	..	..	in front	10.8 ..
Maximum diameter of right upper arm	..	..	..	..	..	..	4.5 .. (?)
.. .. forearm	..	..	..	..	..	..	3.5 .. (?)
.. .. left thigh	..	..	..	..	..	..	10.5 ..
.. .. leg	..	..	..	..	..	..	7.1 ..
Distance from left patella to ankle	..	..	..	..	..	..	8.7 ..
Circumference round buttocks	..	..	..	..	..	..	68.4 ..

4. (Pl. V). Headless male statuette of globigerina limestone with injuries to shoulders, arms, and knees and feet. The rest of the surface is more perfect than that of the previous figures. The finish is rough and the statuette shows the influence of fire. It closely resembles 1, 2 and 3, but is considerably larger. The legs are folded to the right. The right hand rests on the right knee, the left hand is laid beside it on the right thigh. The folds on the abdomen and the umbilicus are clearly indicated.

The socket into which a movable head and neck must have fitted is here nearly perfect and presents some remarkable features. At the bottom of the socket are three small symmetrically-placed irregular excavations about 1 cm. deep and a little less in diameter. In front a bi-conical hole 1·2 cms. in external diameter and diminishing inwards is placed near the middle of the socket. Behind, the upper part of the socket exhibits a small bi-conical hole to the right, while below this is a large oval depression containing two larger inner holes leading to the socket cavity and two smaller outer holes, of which only that on the left penetrates into the socket cavity, the other being blind.

Measurements :—

Extreme height	..	..	..	..	..	..	23·5 cms.
Maximum width across buttocks	..	..	..	..	..	..	29·7 ..
Extreme depth	..	..	..	..	..	..	21·6 ..
Maximum width of thorax between axillary folds behind,							14·2 ..
.. in front							11·2 ..
Maximum diameter of left upper arm	..	..	..	..	..	..	6·2 ..
.. .. forearm	..	..	..	..	..	..	5·2 ..
.. .. thigh	..	..	..	..	..	..	12·2 ..
.. .. leg	..	..	..	..	..	..	8·2 ..
Distance from left patella to ankle	..	..	..	..	..	..	10·3 ..
Circumference round buttocks	..	..	..	..	..	..	85·6 ..

5. (Pl. VI). Lower part of statuette of baked red clay very similar in form and pose to 1-4. The body is broken off at the waist, and the feet at the ankles. The hands remain each resting on the corresponding thigh. Each hand is depicted with *five* fingers and a thumb. Enough of the left forearm remains to show the circular dimple separating the small hand from the enormous arm.

The posterior surface is flattened and slightly concave, and shows traces of having been burnt. The under-surface of the figure is finished and smooth like the other surfaces. It exhibits a groove indicating the division between the thighs. It also

shows a deeper groove indicating the gluteal fold, but there is no trace of separation between the nates.

Measurements : -

Extreme height	..	..	..	..	..	7.2 cms.
Maximum width across buttocks	..	..	..	..	13.8	..
Extreme depth	..	..	..	..	10.5	..
Maximum diameter of right thigh	..	..	..	..	5.6	.. (?)
Circumference round buttocks	..	..	..	..	39.1	..

6. (Pl. VI). Headless statuette of globigerina limestone of rough finish. It represents a sitting clothed female figure. The base is flat and smooth, as with the statuettes 1-4. The general surface of the figure is considerably worn, the right arm has been broken off, and injuries have been sustained especially in the region of the neck and shoulders. Remains of a red pigment can be discerned over the greater part of the uninjured surface.

The figure resembles 1-5 in being enormously fat, and in the small hand separated from the exaggerated forearm by a circular dimple. The outline of the thighs and legs is roughly indicated by lines, and the limbs evidently had a similar general configuration to that of the figures already described. The breasts, which are covered by a garment, rest upon the upper part of the thighs. The conventional folds of the thighs upon the buttocks are clearly indicated laterally.

The woman is apparently sitting on a low stool, which is covered by the skirt. The skirt itself reaches to the ground and is clearly indicated by flounces at its edge, which extend all around it. The skirt is represented as though it were very thin and tight-fitting.

Anteriorly above the breasts the statue is greatly injured, but it exhibits four pit-like depressions, which meet two and two to form small bridges of stone.

Posteriorly the surface of the statue is crossed obliquely by a deep ridge on which spirals have been carved to represent strands of a long pigtail. The waist-line is less defined than in 1-4, but the figure exhibits the same general flattening and concavity of the posterior surface that we have already seen.

Measurements :-

Extreme height	..	..	..	..	..	19.2 cms.
Maximum width across buttocks	..	..	..	..	19.4	..
Extreme depth (excluding pigtail)	..	..	..	..	16.7	..
Circumference round buttocks	..	..	..	..	62.5	..

7. (Pl. VI). Headless statuette of globigerina limestone of rough finish. It represents a sitting clothed female figure. It bears some resemblance to 6, but the

form of the body is more obscured by garments. There are a number of deep pits, especially on the left side of the figure. The neck region has been injured.

The general outline of the thighs is only faintly indicated through the very copious skirt which extends evenly all round. The right hand rests on the corresponding thigh, the left on the abdomen.

The anterior surface of the thorax is pigmented above the circle of a necklace, which extends also posteriorly. Whether this necklace marks the upper termination of a *décolletée* bodice it is impossible to say. The breasts are not clearly indicated. Laterally the surface of the figure does not show the conventional lines of division between the thighs and the buttocks. The pose suggests that the figure is sitting on a stool enclosed within the skirt.

Posteriorly the line of the necklace can be discerned, and above it the surface is tinted red. On the right there is a projection which perhaps represents the remains of a coil of hair. The waist-line is even less obvious than in 6. The general posterior surface of this statuette exhibits a certain degree of flattening and concavity, but less than those previously described.

Measurements :—

Extreme height	..	..	..	..	..	..	23.5 cms.
Maximum width across buttocks	..	..	..	..	..	..	25.6 ..
Extreme depth	..	..	..	..	..	..	25.9 ..
Circumference round buttocks	..	..	..	..	..	..	85.11 ..
Width at edge of skirt	..	..	..	..	..	..	27.8 ..

8. (Pl. VII). Headless statuette of globigerina limestone of rough finish. It represents a standing naked figure of male sex. It is of cruder workmanship than any of those previously described, and has been cut from a flat block, and is very shallow antero-posteriorly. It is of the same adipose type as 1-7. There is no trace of pigment and the statue has sustained numerous injuries. The left hand is broken away, the left shoulder much chipped, and the right hand nearly obliterated.

The right arm is folded transversely so that the hand rests on the upper part of the abdomen. The left arm hangs by the side, the hand resting on the hip. The flat thorax shows no trace of nipples and is of the male type. Extending transversely across the abdomen are four creases, below the lowest of these is a broad flat plate, representing an apron-like layer of abdominal fat. Below these, again, are two broken-off processes representing the thighs.

Laterally only two grooves are discernible, the upper representing the waist-line and the lower the separation of the thigh from the segment above.

Posteriorly the surface of the statuette is almost flat. There is a well-marked waist-line, and below that a deep broad groove representing the gluteal fold, which apparently fitted into some support.

On the upper surface there is a centrally placed hole, into which the tip of the little finger can just enter. The hole extends to a depth of about 4·5 cms. It is, perhaps, of modern workmanship.

Measurements :—

Extreme height	..	..	..	..	..	38·2	cms.
.. width across buttocks	..	..	..	..	..	40·2	..
.. depth	..	..	..	..	..	11·9	..

9. (Pl. VII). Headless figurine of lightly-baked red clay. There are traces of red pigment on its surface. The figuring is of very good workmanship and has been made with a very fine slip. It represents a standing naked female with large pendulous breasts and abdomen. The right hand rests on the right thigh, the left is folded across the abdomen. Above, the clavicles are distinctly indicated. The abdomen presents transverse folds similar to those of the statuettes already described. The umbilicus, the transverse abdominal folds, the inguinal grooves, and the outline of the patellæ are all well shown.

Posteriorly there is a well-marked waist-line. The scapule are clearly implied, as is also the groove between the vertical spinal muscles. The division between the nates, the gluteal folds and the popliteal fold are all true to nature, as is also the light flattening on the postero-lateral gluteal surface over the great trochanter. The general posterior surface of the back and buttocks is flattened and slightly concave, as in 1-8.

Measurements :—

Extreme height	..	..	..	..	..	12·9	cms.
Maximum width across buttocks	..	..	..	..	..	5·0	..
Extreme depth	..	..	..	..	..	3·5	..
Maximum width of thorax between axillary folds behind	..	..	..	..	..	5·1	..
.. in front	..	..	..	..	..	5·1	..
Maximum diameter of right upper arm	..	..	..	..	..	1·4	..
.. .. forearm	..	..	..	..	..	1·0	..
.. .. thigh	..	..	..	..	..	2·6	..
.. .. leg	..	..	..	..	..	1·9	..
Maximum circumference round buttocks	..	..	..	..	..	14·1	..
.. .. shoulders	..	..	..	..	..	16·2	..

10. (Pl. XIX). Small female figure very roughly modelled in baked clay. The left arm is folded over the breasts, the right arm is broken off at the elbow. The figure is broken about the level of the middle of the thigh.

The figure is clothed in a skirt suspended from the waist. The upper border of this skirt is indicated both back and front. At the level at which the figure is broken

the skirt apparently frilled out horizontally. The hair appears to be cut short. The features are not clear but the nose is prominent.

Measurements :—

Extreme length	..	..	..	..	..	..	6.2 cms.
.. width (between elbows)	..	..	..	..	..	..	3.2 ..
.. depth	..	..	..	..	..	..	1.7 ..

11. (Pl. XIX). Small head of lightly-baked clay found in 1914. The head is set on a peg. The features are much worn down, but the short hair shows clearly. The surface is pigmented. The hair is straight and descended to the nape of the neck. The face was probably asymmetrical.

This head was probably made to be set on a small figure of the type described under 1-7.

Measurements :—

Maximum length	..	..	..	..	..	..	5.6 cms.
.. breadth	..	..	..	..	..	..	2.8 ..
.. depth	..	..	..	..	..	..	2.8 ..

12. (Pl. XIX). Small head of globigerina limestone found in 1914. The surface is coloured. The features are very conventionalized and distinct, though much worn. The hair is short.

The neck is thick and is smoothly bevelled off so that it stands firmly on a level surface. It is thus presumably of the nature of a votive offering.

The hair stands out from the face. The eyes are indicated by long horizontal lines and the nose by two perpendicular lines.

Measurements :—

Maximum length	..	..	..	..	..	..	5.6 cms.
.. width	..	..	..	..	..	..	2.0 ..
.. depth	..	..	..	..	..	..	3.2 ..

13. (Pl. XIX). Small model of hand in globigerina limestone found in 1914. The finish is rough. The general form of the hand and of the thumb is modelled. The ends of fingers are shown at the back only, so that from the front the hand is as though enclosed in a fingerless glove. A small portion of the wrist is shown. The posterior surface is bevelled, and on this the hand rests in a stable fashion. The bevelled surface shows the working very distinctly. The object is perfect and unworn.

Measurements :—

Maximum length	..	..	..	..	..	..	8.2 cms.
.. breadth	..	..	..	..	..	..	5.9 ..

14. A large block of globigerina limestone showing the feet and lower part of the legs of two gigantic statues, of which one was larger than the other. The larger may be roughly estimated as having been 12 ft. high. The legs are very worn and injured, but enough of them remains to show that they were of the usual fat type.

A circular dimple is traceable at the point where the feet join the legs. We reproduce no figure of this very fragmentary monument.

15. (Pl. VIII). Head of a small greyish-brown statuette made of fine-grained clay, identical with that used for neolithic pottery. The face is hardly modelled and has been partly broken off. It is difficult to say whether the figure is animal or human. The sides of the head are adorned with spiral decorations reminiscent of ram's horns.

(b) *Hypogeum at Hal Saflieni.*

16. (Pl. VIII). A statuette of globigerina limestone, headless, but found in close association with the two heads described under 17 and 18, in 1908, in a pit dug at the entrance of the Hypogeum.¹ The finish is smooth. This statuette, though in certain respects very perfect, has had half the thorax, the whole of the left arm, the upper portion of the right thigh and the fore parts of both feet broken away. The surface had been rubbed smooth, and traces of red pigment remain on various parts of the surface.

The figure is in the upright position and the right hand rests upon the right hip. The chest is of the flat male type. The arms are very fat, but the hands small. There are four transverse grooves across the abdomen, the lowest being the inguinal groove. The umbilicus is indicated. There is a very great projection of the upper part of the thighs, a genuine feature of very adipose subjects. The patellæ are very lightly indicated.

Laterally the conventionally represented transverse folds between thigh and trunk, so prominent in the Hagiar Kim figures, is here again represented. The enormous development of the buttocks corresponds to that of similar figures already described.

Posteriorly the body presents the usual flatness and concavity. In the upper part of the back is the remains of an asymmetrically placed biconical hole, part of the circumference of which has been broken away, but which led to the neck socket, which reached down to the thorax. The waist-line is well marked. There is no separation indicated between the nates.

Measurements :—

Extreme height	..	..	..	..	..	..	38.9 cms.
Maximum width across buttocks	..	..	..	..	..	..	27.9 ..
Extreme depth	..	..	..	..	..	..	16.8 ..
Estimated width of thorax between axillæ behind	..	..	..	..	..	..	13.0 ..
.. in front	..	..	..	..	..	..	13.0 ..
Maximum diameter of right upper arm	..	..	..	..	..	..	7.2 ..
.. .. forearm	..	..	..	..	..	..	4.9 ..
Transverse diameter of right thigh	..	..	..	..	..	..	13.9 ..
.. .. leg	..	..	..	..	..	..	11.1 ..
Distance from right patella to ankle fold	..	..	..	..	..	..	10.2 ..
Circumference round buttocks	..	..	..	..	..	..	75.1 ..

¹ *Annual Report of the Valletta Museum, 1908-9.*

17. (Pl. VIII). A head of globigerina limestone, with peg-like neck which fits into the remains of the neck-socket of 16. This head, together with that described as 18, was found almost in juxtaposition to statuette 16. The head retains traces of red pigment.

The face is oval, the lower part being fuller and broader than the other. The forehead shows a central top-knot, from which the hair or wig descended perfectly straight to the nape of the neck. This hair is indicated clearly by a series of finely-cut lines which anteriorly show a slightly wavy course. The hair is bevelled at its termination, suggesting a very thick crop. The nose has been broken, but enough remains to show that it was provided with a definite bridge and was wide at the nostrils. The eyes are small and set quite horizontally. The outline of the malar bones is obscured by the fullness of the cheeks, but the position of the fullness demonstrates that the cheek bones were rather high and prominent. The mouth is small, with full lips. The chin is slightly indicated, and is almost continuous with the curve of the cheeks and of the submental fat.

The neck peg has a smooth rubbed surface. A well-defined groove extends three-quarters round it, passing downwards and forwards. The inferior surface is very roughly worked, and probably has been broken off.

Measurements :—

Extreme length	..	..	..	..	..	..	10.9 cms.
.. breadth	..	..	..	..	..	..	7.2 ..
.. depth	..	..	..	..	..	..	8.0 ..
Length of face from top knot to submental fat	..						7.8 ..
Between outer canthus of eyes	..	..	..	..	..	..	3.7 ..
Width of mouth	..	..	..	..	..	..	1.9 ..

18. (Pl. VIII). A head of globigerina limestone resembling 17 in many respects and found with it in juxtaposition to statuette 16. A few traces of red pigment can be discerned.

The face is oval and even fuller than that of 17. The forehead shows the same central knot from which the hair or wig descends, but here the hair is slightly wavy, the waves being indicated as in 17 by finely cut lines, and the whole head-dress is similarly bevelled off at the nape of the neck. The nose is broken, but must have been provided with wide nostrils. The eyes are a little larger than those of 17, though still small; they are set with a very slight degree of obliquity. The cheek-bones appear a little higher than those of 17. The mouth has been largely destroyed, but it was small and with full lips.

The neck peg has been broken away. A central conical pit, 3 cms. deep, on the under-surface of the head shows that in this case the peg was hollow.

Measurements :—

Extreme length	..	..	..	..	..	9.1 cms.
.. breadth	..	..	..	..	..	8.2 ..
.. depth	..	..	..	..	..	8.7 ..
Length of face from top knot to submental fat	..	..	..	..	..	7.8 ..
Between outer canthus of eyes	..	..	..	..	..	4.3 ..
Width of mouth	..	..	..	..	..	1.9 ..

$$\text{Ratio } \frac{\text{Length of head } 17}{\text{Height of trunk } 15} = 0.23 \text{ (cp. measurements of 18).}$$

19. (Pl. XVII). An almost complete figure of semi-transparent white alabaster, similar in form to 16. and with the head *in situ*. It was found in the soil filling one of the rooms in the Hypogeum in 1907. The surface bears traces of a red pigment. Alabaster is a stone foreign to Malta.

The figure is upright and of the usual obese type. The chest is flat and a male is represented. There is no clothing. The right hand rests upon the right hip and the left arm is folded across the upper abdomen.

The face is oval and similar in type to the detached heads 17 and 18. There is a top-knot on the forehead from which the hair or wig descends. The neck is surrounded by a circle of fat such as is frequently encountered in the obese. The arms show the circular dimple above the wrists. The hands are very roughly sketched, but are relatively larger than in the statuettes previously described. The fingers are not indicated. The abdomen is crossed by three transverse creases or folds. The patellæ are hardly indicated.

Laterally the great prominence of the upper part of the thighs is well seen.

Posteriorly the surface is flattened and concave, but these features are, perhaps, less prominent than in the statuettes previously described. The gluteal fold is very definite, but there is no division between the nates.

Measurements :—

Extreme height	..	..	..	..	..	6.4 cms.
Maximum width across buttocks	..	..	..	..	..	3.1 ..
Extreme depth	..	..	..	..	..	2.2 ..
Maximum width between axillary folds behind	..	..	..	..	..	1.9 ..
.. .. in front	..	..	..	..	..	1.6 ..
Diameter of right upper arm	..	..	..	..	..	1.0 ..
.. forearm	..	..	..	..	..	0.8 ..
Transverse diameter of right thigh	..	..	..	..	..	1.5 ..
.. .. leg	..	..	..	..	..	1.1 ..
Circumference round buttocks	..	..	..	..	..	8.9 ..

$$\text{Ratio } \frac{\text{Length of face}}{\text{Height of trunk}} = 0.22.$$

20. (Pl. XIX). A headless figure of white alabaster very similar to 18, but even more obese. It was found in the same room as No. 19. Through the neck a beconical hole has been asymmetrically bored. The figure bears traces of a red pigment.

The figure is upright and the flat chest is of the male type. No clothing is indicated. The pose is identical with that of 19. Apart from being more obese, it differs from 19 in that the fingers are represented, and the back is more concave and flattened. Posteriorly the figure is much roughened, especially in its lower part, and is, perhaps, water-worn.

Measurements :—

Extreme height	..	..	..	..	..	6.2 cms.
Maximum width across buttocks	..	..	..	..	..	5.4 ..
Extreme depth	..	..	..	..	..	2.7 ..
Maximum width between axillary folds behind	..	..	..	..	..	2.7 ..
.. .. in front	..	..	..	..	..	2.7 ..
Diameter of right upper arm	..	..	..	..	..	1.3 ..
.. forearm	..	..	..	..	..	1.0 ..
Transverse diameter of right thigh	..	..	..	..	..	2.7 ..
.. leg	..	..	..	..	..	2.1 ..
Circumference round buttocks	..	..	..	..	..	14.2 ..

21. (Pl. XIX). Small headless figure of red lightly-baked clay. This figure very closely resembles those from Hagiar Kim described as objects 1-5. It is in a sitting posture, with hands folded and legs either symmetrically placed or turned slightly to the left. The feet are broken off. The general surface of the figure exhibits a series of cracks. There are indications that the head was removable, for the upper surface of the thorax does not seem to be fractured. The chest is of the flat male type. The arms are folded, but the hands are not indicated. The buttocks are relatively enormous.

Inferiorly the gluteal fold can be seen. The separation between the nates is also indicated on this aspect, and in this respect this figure differs from all the other obese figures.

Posteriorly there is the pronounced flattening and concavity characteristic of this type of figure. The waist line is indicated.

Measurements :

Extreme height	..	..	..	..	..	1.3 cms.
Maximum width across buttocks	..	..	..	..	..	4.1 ..
Extreme depth	..	..	..	..	..	3.0 ..
Maximum width between axillary folds behind	..	..	..	..	..	1.9 ..
.. .. in front	..	..	..	..	..	1.9 ..
Diameter of right upper arm	..	..	..	..	..	1.0 ..
.. leg	..	..	..	..	..	1.2 ..

22. (Pl. IX). A very perfect baked clay model of a woman lying asleep on her right side on a bed, the head supported by a pillow. There are traces of red pigment. The figure was found by Father Magri in 1905 in a deep pit of one of the painted rooms.

The figure is immensely adipose. The buttocks and legs are enormous. Upper arms and forearms are greatly distended. The hands are very small, and the right hand clasps the cubical pillow on which the head rests. The breasts are large and prominent, though pressed downwards and partly hidden by the left arm. The abdomen is transversely grooved and the umbilicus indicated.

The figure is clothed in a skirt terminating above in a rolled band. This band is supported on the enormous hips, but does not appear to clasp the waist tightly. The body is naked above the skirt. The skirt has a flounced edge and exhibits a definite pattern, the *motif* of which is identical with that of certain other figures encountered at Tarxien (objects 38, 39, 42, 43, 44, 45, 55, 58).

The upper surface of the bed itself is smooth and concave. Below, its surface is hatched, perhaps to represent wicker work, and is supported by four longitudinal curved bars, also cross-hatched. These are in their turn supported on two transverse beams.

Measurements :—

Extreme length of object	..	.	..	..	..	12.3 cms.
.. breadth	..	..	..	..	..	7.2 ..
.. depth	..	.	..	..	..	7.1 ..

23. (Pl. X). A terra-cotta model found along with 22, somewhat similar to it, but smaller and less perfect. There are considerable remains of red pigment.

The body, which is almost certainly female, is here lying on its face. The head is missing, but the pillow remains. The waist is not markedly constricted. The figure is naked to the waist, just below which a thick band supports the skirt. The skirt extends below the knees and appears to have been flounced anteriorly, but not posteriorly. The figure is very fat, but less so than 21. The feet are represented as somewhat larger than in the other figures.

The bed is hatched below, as in the case of 21. It is supported on a rectangular framework, which in its turn is raised on four peg-like supports.

Measurements :—

Extreme length of object	.	.	..	..	..	9.1 cms.
.. breadth	..	..	..	..	..	6.1 ..
.. depth	..	..	.	.	..	4.9 ..

24. (Pl. X). Fragment of a statuette of well-baked clay of very good workmanship. The statuette was not made complete, for its upper surface is smooth and bevelled off obliquely, so that it only represented the figure from the waist downwards. The upper part in the region of the umbilicus is broken away, as is also

the left leg at the knee and the right foot. The object is not stable when laid on the bevelled surface.

The surface-markings of a plump but not obese figure are rendered with great skill and accuracy, and the object may be compared to 9 from Hagiar Kim, which it rivals in workmanship. It was originally, perhaps, a pendant.

Measurements :—

Extreme vertical length	..	..	..	..	..	6.7 cms.
.. breadth	..	..	..	..	..	3.6 ..
.. depth	..	..	..	..	..	2.3 ..

25. (Pl. X). Torso of a small baked clay female figure, broken off at shoulders and hips. The arms are very crudely rendered. Enough of the back remains to show the nates were correctly rendered, and to prove that the characteristic hollowness of the fat figures was not present. The breasts are large and pendulous.

The figure may be compared in workmanship to the Mnaidra objects 29 and 30 and Tarxien 46.

Measurements :—

Vertical height	..	..	..	..	..	3.8 cms.
Extreme breadth	..	..	..	..	..	3.0 ..
.. depth	..	..	..	..	..	2.7 ..

26. (Pl. X). Head of baked clay, with traces of red pigment. The face is oval. The nose is very prominent and narrow. The eyes small, horizontal and prominent. The mouth is very small and shaped like a berry. Enough of the head-dress remains to show that the hair was straight.

Measurements :—

Extreme vertical length	..	..	..	..	..	5.6 cms.
.. breadth	..	..	..	..	..	4.2 ..
.. depth	..	..	..	..	..	3.8 ..

27. (Pl. XIX). Minute roughly modelled baked clay figure in a squatting posture. The arms are folded. Head and legs missing.

Measurement :—

Extreme height	2.7 cms.
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28. (Pl. XIX). Minute headless baked clay kneeling figure. The object is very roughly modelled. The arms are folded on the chest.

Measurement :—

Height	4.1 cms.
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(c) *Mnaidra*.

Objects 29, 31, 32 and 33 were found by Dr. Ashby in 1910. Object 30 was found by Zammit in 1914.

29. (Pl. XI). Female torso of lightly-baked red clay. Head, forearms and legs are absent, but these have not been broken off, for the figure is almost complete and rests firmly on a level surface. The left upper arm has been broken off.

The breasts are represented as very large and protruding. They lie upon an immense tumour that projects from the abdomen. The female genitalia are clearly implied.

Posteriorly the figure is represented as wasted. Twelve vertebrae are shown, eight having ribs coming off from them on either side. The iliac regions are represented as hollow and fallen away. The back view is thus a realistic figure of the wasting associated with prolonged disease as with an abdominal tumour.

Measurement :—

Height 5.1 cms.

30. (Pl. XX). Female torso of lightly-baked clay. This object is probably complete. The head region appears to be worked, and a saddle-shaped area occupies position where the thighs should be jointed. Similar oval areas mark the attachment of the arms. The breasts are comparatively small, but are evidently female. The abdomen exhibits two transverse grooves and the umbilicus is indicated. The abdomen is very prominent.

Posteriorly the object is almost entirely flat and has very little of the convexity characteristic of the obese figures of Hagiar Kim and Hal Safienî.

Measurement :—

Height 4.2 cms.

31. (Pl. XI). Head and neck of baked clay. The face was oval, but has been injured in the lower part. The cheeks were greatly puffed out. The eyes are small and horizontally set. The nose is broken, but there was a well-developed bridge and the nose was not very broad. The neck is extraordinarily long and has been broken off. The hair is quite straight, as implied by a series of incised lines.

Measurement :—

Height 8.5 cms.

32. (Pl. XX). A small baked clay leg that has been, perhaps, broken off from a large figure. It is possibly part of a fat figure.

33. (Pl. XX). A small leg of roughly cut limestone.

34. (Pl. XVII). Small globigerina limestone figurine. It is barrel-shaped, and stands on a circular base 2 cms. in diameter. It is 4.6 cms. high. The face is flat and rounded, with large prominent nose. The mouth and eyes are hardly visible. It is very poorly worked.

(d) *Tarsien*.

The objects here described as 35-60 were found by Zammit in 1915-17. Objects 61 and 62 were found by Zammit in 1922.

35. (Pl. XI). Base of large seated statuette of globigerina limestone. The figure is smoothly finished and is placed on a low pedestal.

It is identical in form with those described as 1-5 from Hagiar Kim. The legs are tucked away to the left and the very small feet and hollow soles are well seen.

Laterally there are the two usual conventional folds of the thigh.

Posteriorly there is no sign of the gluteal fold, but hardly enough of the statue remains to say if it exhibited the characteristic posterior flattening of these figures.

Measurements :—

Extreme height	..	..	..	..	..	..	21.5 cms.
.. breadth	..	..	..	..	..	..	29.0 ..
.. depth	..	..	..	..	..	..	23.6 ..
Maximum diameter of right leg	..	..	..	..	..	..	10.4 ..
Distance from patella to ankle fold	..	..	..	..	..	..	13.1 ..

36. (Pl. XI). Small headless statuette of soft bluish limestone. The statuette is of the usual extremely obese type, but presents several peculiarities. The body is sitting symmetrically and the thorax is so flat that, looked at laterally, it appears merely a small outgrowth on the enormously distended buttocks.

Anteriorly the chest is of the male type. No breasts or nipples are indicated. The abdomen presents three transverse grooves. The umbilicus is faintly implied. The hands rest each on the corresponding thigh. They are small and show the circular dimple. The forearms are less fat than usual. The feet are broken off.

Laterally are the two conventional creases between buttocks and thighs.

Posteriorly the back of the thorax is flattened and set at an angle to the enormous curve of the buttocks.

Above is a little oval area to which the head was attached.

Inferiorly there is no sign of the gluteal fold, though the natal crease is faintly outlined.

Measurements :—

Extreme height	..	..	..	..	..	..	7.5 cms.
Maximum width across buttocks	..	..	..	..	..	..	10.2 ..
Extreme depth	..	..	..	..	..	..	6.2 ..
Maximum width of thorax between axillary folds behind	..	..	..	..	..	..	4.5 ..
.. in front	..	..	..	..	..	..	5.3 ..
Maximum diameter of right upper arm	..	..	..	..	..	..	2.1 ..
.. .. forearm	..	..	..	..	..	..	1.0 ..
Circumference round buttocks	..	..	..	..	..	..	27.0 ..

37. (Pl. XII). Base of a small fat figure of baked clay with a fine slip. The fragment is broken off at the waist and the two feet are missing.

The statuette was sitting almost symmetrically with the feet tucked slightly to the left. The usual enormous buttocks and posterior flattening are exhibited. The posterior surface is highly polished.

Measurement :—

Height	3.8 cms.
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38. (Pls. XII and XIII). Fragments of a statue in unbaked clay. The figure was originally about 60 cms. in height. Three fragments have been recovered, consisting of the skirt, head, and a part of the left arm and chest. We shall describe these in order as (a), (b) and (c).

(a) Lower front part of a draped figure of unbaked clay. It is hollow and carried a full skirt which tapered towards the waist. It was found broken into fragments which have been pieced together.

The skirt is pleated, the folds being crudely represented by a conventional pattern. Close to the middle line a series of punctiform and slightly elongated marks indicate, perhaps, the fastening of the gown.

Measurements :—

Extreme height	..	..	..	..	..	..	32.5 cms.
.. width	..	..	..	..	..	..	23.9 ..

(b) Head of unbaked clay with signs of accidental burning in a fire. The neck is broken off and the head is hollow, and shows the marks of the instrument with which it was worked.

The forehead is somewhat square. The upper part of the face is narrower than the lower. Eyes are set horizontally, and the internal canthus of both eyes is indicated by a punctiform mark. The nose is complete. It is straight and stands out from the face, and is not markedly broad. Cheeks are full and mouth small. The chin is indicated, and there was evidently considerable fullness below it where the clay is broken away.

The head-dress is striking and appears to be a wig not dissimilar to that used by a modern English barrister. There is a small central straight fringe above the forehead, and extending from the back of this is something of the nature of a net, which covers the upper part of the head. Below this there is a series of four transverse ridges marked with vertical pits. The whole head-dress terminates at a bevelled edge in the neighbourhood of the nucha.

Measurements :—

Vertical length	..	..	..	..	..	..	12.1 cms.
Extreme breadth	..	..	..	..	..	..	9.9 ..
.. depth	..	..	..	..	..	..	10.0 ..

(c) Fragment of a hollow statuette of unbaked clay consisting of a portion of the shoulder, the upper arm and a portion of the forearm.

Measurements :—

Extreme length	..	..	..	..	..	..	17.8 cms.
Maximum diameter of upper arm	..	..	..	..	..	..	8.1 ..

39. (Pl. XIII). The lower portion of a figure similar to 38. The skirt is shorter, but surrounded by an identical pattern. The curvature is here flatter than in 38 (a), and it probably represents the back of the skirt. Punctiform marks similarly indicate the fastening of the gown.

Measurements :—

Extreme height	..	..	..	..	..	..	18.3 cms.
.. width	..	..	..	..	..	..	19.8 ..

40. (Pl. XIII). Fragment of a hollow statuette of unbaked clay. This fragment probably formed the back of the thorax of a figure and is, perhaps, a part of the same statuette as 39. Down the surface of the fragment a line has been traced with a series of punctiform marks. This, perhaps, represents the fastening of the gown, as in 38 and 39.

Measurements :—

Extreme length	..	..	..	..	..	..	17.9 cms.
.. breadth	..	..	..	..	..	..	14.5 ..

41. (Pl. XIII). Head of unbaked clay almost complete. It may possibly be referred to the same statue as fragments 39 and 40.

The forehead is square. The face is much less full than that of 38. The eyes are worn down, but were horizontally set. The nose is completely straight and in a line with the slightly receding forehead. The chin is less pointed than in 38. There is a fullness under the chin which extends into the neck. The hair is parted down the middle and is represented by a few coarsely marked lines. The hair terminates at the nucha.

Measurements :—

Vertical length	..	..	..	..	..	..	9.3 cms.
Extreme breadth	..	..	..	..	..	..	7.4 ..
.. depth	..	..	..	..	..	..	8.5 ..

42. (Pl. XIV). Irregular fragment of a statuette of globigerina limestone. The fragment consists of a part of the skirt edge of a very fat sitting figure. The outline of the leg shows through the garment and extends beyond its hem, where the distended tapering limb can be seen. The right hand rests on the right knee. The edge of the skirt has flounces.

Measurement :—

Extreme vertical height	21.4 cms.
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43. (Pl. XIV). Irregular fragment of a large statue of globigerina limestone. The statue must have been about 300 cms. (10 feet) high, and the fragment remains at the date of writing in the excavations at Tarxien. It is very similar in character to 42, and represents the portions of two legs and the skirt edge of a fat figure, probably standing. The toes are not indicated, and it is possible that the foot was covered with a shoe.

Measurements :—

Estimated maximum width	..	..	..	..	180 cms.
Total height	..	..	..	..	129 ..
Depth	..	..	..	..	78 ..

44. (Pl. XIV). Irregular fragment of a statuette of globigerina limestone. Only a part of the skirt has remained, but this bears a pattern similar to objects 22, 38, 39, 42, 43 and 45. It is probably from the back of the skirt. The statuette must have been very fat and was probably about 30 cms. in height.

45. (Pl. XIV). A similar but more worn fragment of the skirt edge of a statue of globigerina limestone. The statue was probably 50-60 cms. in height.

46. (Pl. XIV). A well-worked fragment of the chest and right arm of a fat statue which, if sitting, must have been about 40-50 cms. in height.

47. (Pl. XIV). A similar fragment of the chest and right arm of a fat statue which was of about the same height as 46.

48. (Pl. XV). An irregular fragment of globigerina limestone on the surface of which a dark red stalactite has grown, which has been carved into a human face with the rough outline of the neck and shoulders.

The face is oval or almost round. The eyes are large and horizontal. The mouth very small. A large fold of fat surrounds the neck. The head-dress is not indicated. The nose has been flattened, but was moderately prominent.

Measurement :—

Height	7.1 cms.
--------	----	----	----	----	----	----	----	----------

49. (Pl. XV). A small baked clay model of a naked female figure. The work is very rough, but the figure is quite complete and stands firmly in the upright position. The head has not been delineated and the figure is cut short in the upper part of the thighs. The right arm hangs down by the side and the hand points to the genitalia. The left arm is raised and the hand laid on the nape of the neck. The fingers are not indicated.

Anteriorly the breasts are seen to be large and pendulous. The abdomen is very large and prominent. The umbilicus is indicated. Below in the region of the left groin appears to be a large swelling or tumour. The genitalia are very plainly indicated.

Literally there is no flattening or concavity of the back, which, indeed, is given a kyphotic curve. There is hollowness over both ilia.

Posteriorly eight vertebræ and their ribs have been clearly marked out.

A curious feature of this figure is that small pieces of white shell were stuck into it when it was in the wet condition. Such fragments are found in the neck, in the region of the manubrium sterni under both armpits, between the breasts, at the umbilicus, on the mons veneris, in both groins, in the base of the figure, on two of the ribs, three of the vertebræ and on both scapulæ.

The figure very closely resembles 29 from Mnaidra and, perhaps, like it, represents a pathological condition. A combination of abdominal swelling and enlarged groin and other glands is encountered in forms of Filariasis.

Measurement :—

Length	6.1 cms.
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50. (Pl. XV). An oval white striated stone carved in the form of a human face. Stones of this character are not native in the island. They were, however, a favourite medium for small objects with the neolithic Maltese craftsmen.

The object is pierced from top to bottom by a hole so as to serve as a pendant. The eyes are large and almost horizontal. The nose is thick and not prominent. The cheek bones are rather high and somewhat prominent. The mouth is small and the lips full. The chin is pointed.

Measurements :—

Length	..	..	..	..	..	..	..	4.1 cms.
Breadth	..	..	..	..	..	..	..	3.3 ..

51. (Pl. XVII). Human face, cut in low relief on one of the sides of a small rectangular piece of globigerina limestone, rounded at the top and broken at the base. The forehead and the nose stand out clearly, the eyes are but two holes, the mouth is indicated by a line, and the chin is very faintly marked.

The figure is 34 mm. high, 20 mm. wide and 20 mm. thick. It was discovered on the 11th June, 1917, at Tarxien, in neolithic material.

52. (Pl. XVII). Head of small globigerina statuette, broken at the neck, 45 mm. high, 40 mm. wide at the base of the neck, and 45 mm. thick. The face is flat and broad, with a round chin, straight nose, linear eyes with raised outlines to represent the eyelids, the mouth is prominent and the lips thick. There is a slight degree of prognathism. The neck is excessively thick, the forehead is low, the head is covered with thick hair arranged in folds and a long pigtail neatly plaited. It does not appear that the figure is wearing a wig.

53. (Pl. XVIII). Small clay headless female figurine, 30 mm. high and 25 mm. wide, in a sitting posture, with thighs drawn up against the chest; the left leg crosses the right one, the right arm is close to the right knee, the hand is wanting, the left arm is also broken. Two pendulous breasts come in touch with the thighs; the back is flat, but shows a marked slender waist. The figurine was found among neolithic material at Tarxien.

54. (Pl. XVIII). Fragments of clay female figure, of which the legs and the upper part of the body are wanting, the back is flat and bent forward, the thighs are firmly closed together. The sexual triangle is clearly shown by a deep incision. The underpart of the thighs is deeply concave. The fragment is 10 cms. wide, 65 mm. high, the thighs are 80 mm. long. It is of a red colour, due to a slip laid on a coarse clay. Found at Tarxien among neolithic material.

55. (Pl. XX). Limestone fragment of draped fat statuette, broken at the waist, and showing the plaids of the skirt or kilt. This fragment was found in the Tarxien ruins in June, 1917. It is 18 cms. high and 15 cms. wide.

56. (Pl. XVIII). Fragment of baked clay female statuette in a sitting posture, found at Tarxien. It is 55 mm. broad, 42 mm. high, the thighs being 45 mm. long. As with 52, the legs and the upper part of the body are wanting. The modelling is good and the figure shows no abnormal fatness. The back is straight, and the sexual triangle is shown by deeply incised lines. It is poorly baked and is, consequently, of a blackish colour, with reddish patches where it came in closer contact with the fire.

57. (Pl. XVIII). Head of clay male statuette. It is probable that the head stood on a kind of pedestal, as the neck opens out widely, forming a circular base at a level with points where the shoulders should be. It is well modelled, with clear-cut nose, prominent jaws, thick lips, small ears and thickly outlined eyes. It wears a short curly wig, the curls being shown by deep pittings. It is of a fawn colour, due to a slip laid on rough material. It is 7.0 cms. high, 3.0 cms. between the cheek bones, and 5.0 cms. at the base of the neck. It is damaged at the back, the right side of the face and the tip of the nose.

58. (Pl. XVI). A quaint sculptured stone in a battered condition was found among the *débris* of the Tarxien ruins. The stone, a block of ordinary globigerina limestone, is 18 cms. high, 24 cms. wide, and 20 cms. thick. It appears to represent the lower part of a sitting figure, of which the upper portion was probably cut on a separate stone and joined on to the lower piece by a tenon. A mortise is still visible on the upper face of the stone: of the figure we have only the lower part, covered with a plaided skirt or kilt which reaches below the knees. A pair of fat, pear-shaped legs hang down below the skirt, but the feet are broken off.

The figure sits on a panelled rectangular bench. The back of the stone shows only the plaided kilt and the panelled bench.

The sides of the stone are decorated with human figures in relief.

The right side shows two standing figures, of the usual Maltese neolithic corpulent type, cut in low relief on the kilt of the main figure and separated from each other by a pillar. They resemble some of the Hagiar Kim, Hal Saflieni, and Tarxien images. Both figures are naked to the waist, with pear-shaped legs protruding from a kilt that reaches below the knees. The right forearm is bent on the chest and the left limb

hangs straight along the body. The heads of both figures are badly defined, the stone being damaged at the level.

The left side shows another pair of standing figures. It is not clear whether they wear a kilt or whether they have abnormally fat hips and thighs. The arms are in the same position of the other figures described, and a pillar separated likewise the two figures.

Below the line of the feet there is a depression of about 2 cms., in which a group of figures in bold relief is cut.

In the middle of the space is a sitting figure with the bent forearm resting on the knees. To the left a human face can be made out, but the rest is uncertain owing to the damaged condition of the stone. To the right there is another sitting figure, with distinctly round face, the left forearm rests on the lap, the right forearm is bent, and the hand points upwards at a level with the head.

The stone is damaged at various points, and is covered with a muddy stalactitic slime which cannot be removed, and which renders the outlines of the figures uncertain.

59. (Pl. XX). A small stone statuette found in 1921 in the Hal Tarxien ruins. It is headless, with an oval base. It represents a sitting figure in a restful posture. Undraped to the waist, the arms lie close to the body, and the hands, which are not clearly defined, meet on the lap. Like some of the corpulent figures of Hagiar Kim, the hips are very prominent and bulge beyond the waist, giving to the body a globular appearance. The back is slightly concave in the middle line. The lower part of the figure seems to be draped, but neither folds of the drapery are apparent nor the outlines of the limbs. The feet are wanting, but they are faintly indicated at the base.

The figure is of soft globigerina limestone and measures :—

Total height	..	..	..	..	..	..	75 mms.
Extreme width	..	..	..	..	..	..	85 ..
Thickness of body	..	..	..	..	..	..	60 ..

60. (Pl. XX). Among the neolithic representations of the human figure one should not omit to mention the faces stuck on a sherd discovered at Hal Tarxien. It is a fragment of a large clay vessel decorated in an extraordinary manner. Raised figures of hogs formed a band around the vase, and underneath these several rows of bosses were stuck. These bosses are oval and modelled in the shape of human faces with regular European features, good chins, strong noses and high foreheads. The eyes are represented by slits. The average size of the faces is 25 mm. by 15 mm.

61. (Pl. XV). Base of small statuette, probably that of a male, in globigerina limestone. The figure is naked to the waist and in a sitting posture. The hands repose in the lap. The full skirt bears a peculiar ornamentation of lines and points. The height of the original was about 25 cms.

62. (Pl. XV). Dark brown potsherd of well-baked clay of the usual Maltese neolithic type. On the sherd is roughly scratched a human figure. The thighs and legs are of the fat form, as are also the very rudely represented arms. The thorax is small and angular, and the waist well defined. The head appears to be carrying a wig. The figure is drawn with a freedom which suggests a sketch by an artist who had considerably greater powers. Lines which pass along the body are perhaps intended to represent clothing.

(e) *Gigantia at Gozo.*

The two heads here described were found in 1832 by General de la Marmora in the Terminal Chapel of the larger temple.

63. (Pl. XX). A head of globigerina limestone, now much worn and apparently representing a male. The face is oval, the eyes horizontal, and the nose moderately prominent with a well-developed ridge. The chin is well marked. The hair is indicated by finely marked lines and is bevelled off at the nape of the neck.

64. (Pl. XX). A head of globigerina limestone, also apparently that of a male. It much resembles object 49, but is even more worn. The chin is very prominent.



1.



1.



1.



2.



3.



4.

OBJECTS FROM HAGIAR KIM, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



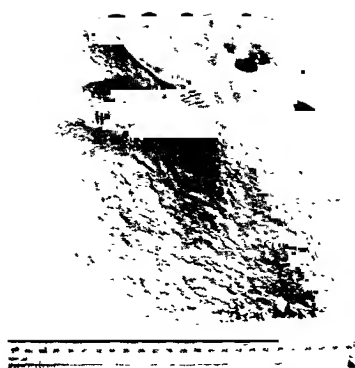
5.



6.



6.



7.



7.

OBJECTS FROM HAGIAR KIM, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



8.



8.



9



9.



9.

OBJECTS FROM HAGIAR KIM, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



15.



15.



16.



16.



17.



18.

OBJECTS FOUND AT HAGIAR KIM (15) AND HAL SAPIENI (16-18), MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



22



23

OBJECT FROM HAL SALLINI, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



23.



23.



25.



24.



26.

OBJECTS FROM HAL SATTILNI, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



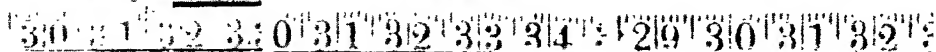
29.



29.



29.



31.



35.



36.



36.

OBJECTS FROM MNADRA (29 AND 31) AND TARMEN (35 AND 36), MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF MALTA AND GOZO.



37.



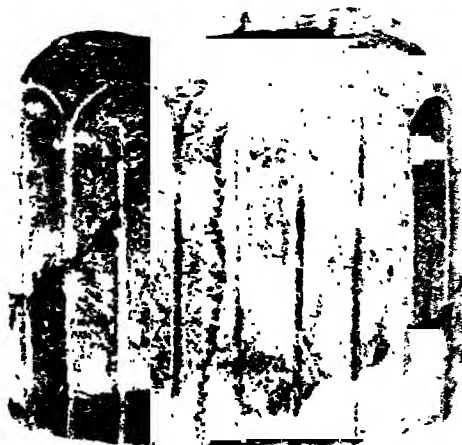
38.

OBJECTS FROM TARRIEN, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



38.



39.



38.



41.



40.



41.

OBJECTS FROM TARNIEN, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



42.



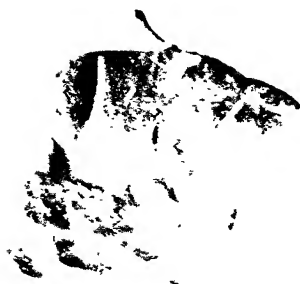
43.



45.



44.



47.



46.

OBJECTS FROM TARNIEN, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



49.

49.

49.



48.



50



61.



62.

OBJECTS FROM TARNIEN, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.

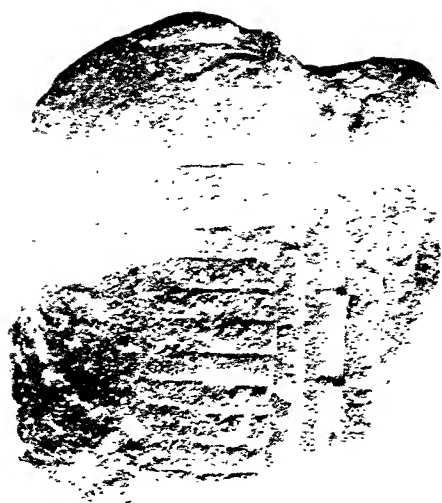


58. FRONT.



58. RIGHT.

OBJECT FROM TARNIEN, MALTA.



58. BACK.

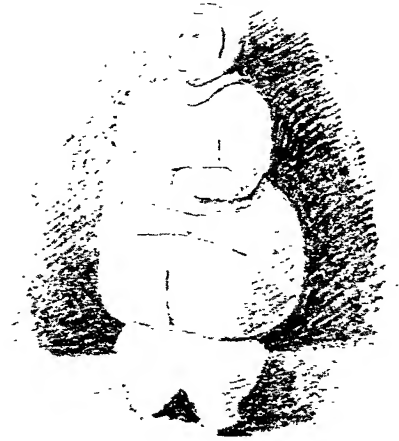


58. LEFT.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



19.



19.



34.



51.



52.



52.

OBJECTS FROM HAL SALLINI (19), MNADRA (34), AND TARNIEN (51 AND 52), MALTA.
NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



53.



53.



53.



54.



54.



56.



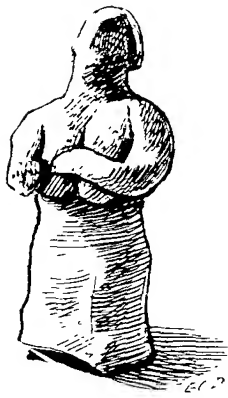
57.



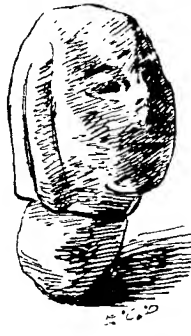
57.

OBJECTS FROM TARNIEN, MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.



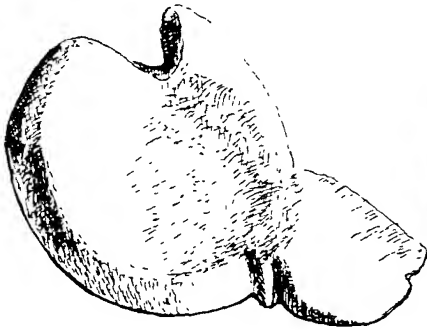
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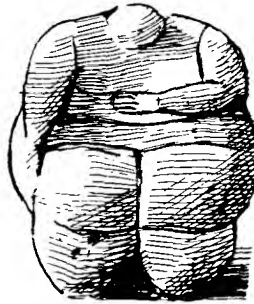
11.



12.



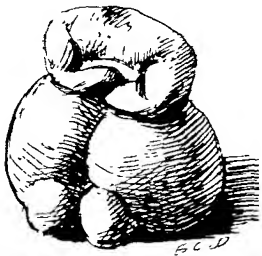
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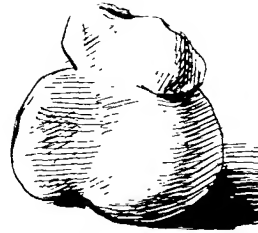
20.



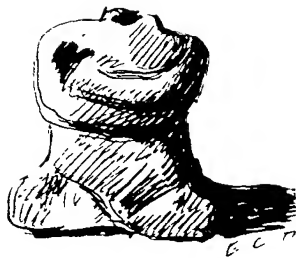
20.



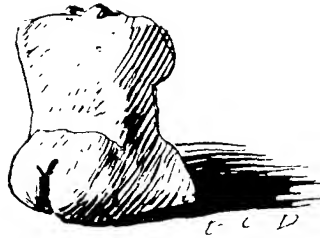
21.



21.



27.



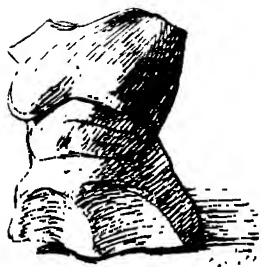
27.



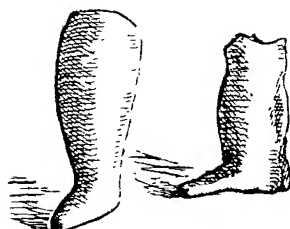
28.

OBJECTS FROM HAGIAR KIM 10-12, 13, AND HAL SATTIENI (20, 21, 27, 28), MALTA.

NEOLITHIC REPRESENTATIONS OF THE HUMAN FORM FROM THE ISLANDS OF
MALTA AND GOZO.

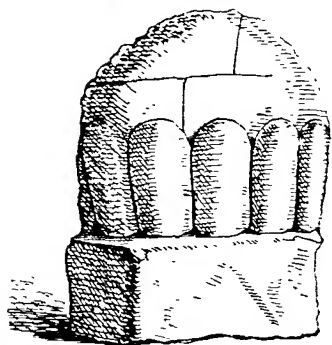


30.

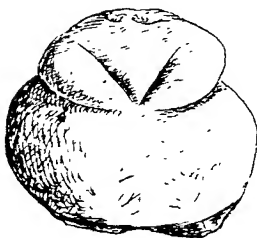


32.

33.



55.



59.



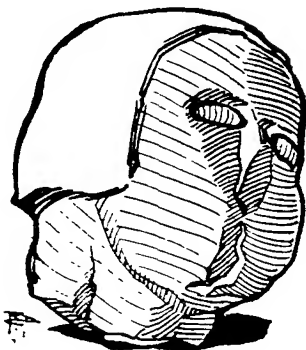
59.



60.



63.



64.

OBJECTS FROM MNAIDRA (30, 32, 33) AND TARNIEN (55, 59, 60), MALTA,
AND GIGANTIA (63, 64), GOZO.

CANOES IN THE GILBERT ISLANDS.

[WITH PLATE XXI.]

By ARTHUR GRIMBLE.

PLATE XXI, Fig. 1 gives a good general idea of the sort of craft to be described. It is a picture of the solitary remaining Gilbertese *Baurua*, generally called a War Canoe, but in reality a craft of uses far more varied than that name would imply. It was the usual deep-water craft of the islanders, the vehicle of inter-island traffic of all kinds, and the vessel in which, we are to suppose, the Gilbertese forefathers migrated from Samoa into the Group. In form and type it may be regarded as a mere enlargement of the smaller canoes used for fishing, racing, and lagoon or coastal traffic, with a few constructional modifications rendered necessary by its greater size. For example, it has five outrigger-booms, while the ordinary fishing or sailing canoe of 5 to 12 metres' length would have only two or three: and, on account of the rough seas it may meet, it has a far more pronounced shearing than its smaller sister.

Like the vessel whose construction we are about to follow through its various stages, the *Baurua* illustrated was double-ended, which is to say, it had two stems instead of a stem and a stern; both ends of the vessel may therefore be regarded as bows. The reason for this type of construction will appear later, when methods of navigation are discussed. Again, like all Gilbertese craft, the *Baurua's* hull was built up of small slabs of timber, lashed end to end and edge to edge with sinnet. The lashings appear plainly in the figure, and so also does the curvilinear mode of laying the planks (or stakes), tier on tier, parallel with the whole length of keel and stems.

The *Baurua's* specifications are approximately¹ as follow:—Length over all, 60 feet; beam amidships, 7 feet; height from keel to gunwale (interior measurement), 5 feet 10 inches; length of outrigger booms (out board), 20 feet; length of float, 18 feet; breadth of float at middle, 10 inches; depth of float at middle, 9 inches.

The canoe which I am about to describe was a fishing craft, a "counterpart in miniature" of the above. It was built, on account of war prices, of native material throughout, but when launched it was as staunch a craft of its size as I have seen on the lagoons. The tools used in the work were astonishingly simple, considering results. There were four adzes, of the pattern common to nearly every group of Oceania: and there was one of those almost equally familiar pump-drills. The adze-

¹ By ill-fortune, the capsizing of a boat lost me (among other things) my notes on the precise measurements of the *Baurua*, which I had taken on the spot.

blades were certainly of metal, being pieces of hoop iron, patiently filed to shape and sharpened on hones of coral: while the pump-drill was furnished with two metal bits, made respectively of a six-inch bolt and a four-inch wire nail. But all the other tools, such as they were, were of exclusively native material: they consisted of wood-rasps, made of the cured hide of the sting ray mounted on wooden handles: a piece of pumice stone for honing the adzes and for rasping wooden surfaces where necessary, and a few fish-hides of rough texture for use as emery-paper.¹

The first thing to do was to find a place where the canoe should be built. On an island whose whole surface consists of level sand this would not seem difficult, but the old man who acted as master-builder thought otherwise. First, it must be *mauri* (*blessed* or *lucky*), and secondly it must be quite near his sleeping quarters, so that no stranger might creep by night to pry into the methods of construction secret to his family. In the old days, the craftsman would have lived and slept by his work to guard against trespassers, but in these days of Government control he must retire at curfew to his lawful sleeping-place. So my old friend (a Church-member, by the way, but of the rather common Christo-Pagan species) took counsel with his ancestral gods through the medium of divination. His divining outfit consisted of an old coconut-shell half full of small, smooth coral stones. Taking this in his hand he went with it at point of dawn to a secluded spot and, facing east, recited the following spell:—

<i>Na Areau e Katiri, ma Na Areau e</i>	<i>Na Areau</i> ² looks on, <i>Na Areau</i> looks on!
<i>Katara! E taetae, ngo-ngo, ba Auriaria.</i>	He speaks, murmurs, for <i>Auriaria</i> ³ (invokes him).
<i>Na Areau e Katiri, ma Na Areau e</i>	<i>Na Areau</i> looks on, <i>Na Areau</i> looks on!
<i>Katara! E taetae, ngo-ngo, ba Tituaabine.</i>	He speaks, murmurs, for <i>Tituaabine</i> ⁴ (invokes him).
<i>Na Areau e Katiri, ma Na Areau e</i>	<i>Na Areau</i> looks on, <i>Na Areau</i> looks on!
<i>Katara! E taetae, ngo-ngo, ba te aomata;</i>	He speaks, murmurs, for a man (invokes him):
<i>Bu.... Bau.... Ki-e-e.... te aomata'</i>	Bu Baa Ke-e-e a man!

This naïf invocation he repeated three times, facing East, and then at once proceeded with his divination. Emptying the coral pebbles in a heap from the coconut shell, he took a handful of them at random, at the same time thinking of one of the places he favoured for the building of his canoe. Then he counted out

¹ The drill, a rasp, and a fish-skin are now in the British Museum.

² *Na Areau*: the creator of Gilbertese myth, Sir Spider. Tutelar deity of many forms of divination. The words *Katiri* and *Katara* are both translated *looks on*; *Katiri* is not a true word, being merely a euphonic variant of *Katara*. Such interchanges of vowels are very common in song and incantation among the Gilbertese.

³ *Auriaria*. An ancestral god, with whom the speaker identifies himself.

⁴ *Tituaabine*. An ancestral god, with whom the speaker identifies himself.

the stones in his hand *by threes*, and if the number he happened to hold was a multiple of three, it was a very lucky sign. If that test failed him, however, he did not give in at once, but counted the pebbles out again *in pairs*, his hope being to find an even number—the next best thing to a multiple of three. Supposing him to have had that moderate amount of good fortune, we are not to imagine him deciding in haste. He first tested the "luck" of the other building-places in his mind, by a repetition of the counting-out process, and if he chanced upon a multiple of three he would take it as a sure sign that the place indicated was the one and only spot for his work. My veteran friend, who told me all these things at a later date and gave me his divination-outfit (now in the British Museum), informed me with some amount of staid pleasure that the working place he had chosen was twice blessed, having been indicated by a number that was a multiple of three and two in one handful—eighteen, to be precise. It was certainly a very convenient spot, not more than 15 yards from his sleeping-house, with the extra advantage of being near the cooking-fire, whence his grandson brought him his food.

The ground having been nicely levelled, a rough thatch of coconut leaves, a dozen yards long by four wide, was raised in the midst: its eaves stood some four feet high. This roof was the shield of work and workers from the elements, while a screen of coconut leaves under the eaves prevented prying eyes.

Then they went out to collect timber for the craft. Under the old man's instructions, these were the woods they sought:—

For keel and stems, *te itai* (*Calophyllum inophyllum*) or *te Kanara* (? *Cordia subcordata*)¹: for the ribs, *te uri* (sp. *fragraea*) or *te buka* (*Hernandia peltata*). For planks, preferably *fragraea*, but any of the other woods mentioned was allowed as a substitute. For outrigger booms, only the hardest seasoned coconut timber is ever used by craftsmen. My old man owned three pieces in a half-dressed condition, which his long-deceased father had slung to the roof of his dwelling, and these had been preserved against rot by occasional rubbings with coconut oil. They were as hard as steel and very stiff. My friend produced them with a sedate chuckle, remarking "*Kai, e na bōtoā rama-u ia*" (lit., *Ah, it will ride-buoyantly my-outrigger-float to this*).

The timber for the various parts took four men a couple of weeks to cut and bring home, but a good deal of this time was spent in half-dressing the heavier pieces where they lay felled, for ease of transport. I arrived at the workshop when the last load came in, and was amazed at the enormous pile of material that was accumulated. The answer to my query was very terse and expressive: "One tree, one plank." The timbers used are not straight in the grain and cannot be split into slabs by driving

¹ A timber of medium weight and hardness, which becomes almost everlasting when soaked in salt water. It has an unpleasant smell when fresh-cut, but on seasoning acquires a sweet, aromatic scent. Cut along the grain, it shows beautiful markings of old ivory and chocolate, in broad bands. I am not at all sure of the "*Cordia subcordata*."

wedges : nor has the Gilbertese native, to the best of my knowledge, ever discovered the use of the wedge. For every plank he needs he must, therefore, dub a whole tree-bole into shape. This is, of course, supposing him to have no handsaw, which is an imported tool. Even with a handsaw it is a tedious business to make boards from the tough native timber : with metal-headed adzes it is worse, while the difficulty of such a task with the old tools of *Tridacna* shell is painful to contemplate.

Working moderately hard for about eight hours a day, the four able-bodied workers of my friend dubbed out fifteen planks of about 12 ft. \times 8 in. \times 1 in. in one month with metal adzes. These were then laid aside to season, while the keel and stems were made. For the keel a beautiful straight piece of *calophyllum* timber 18 ft. long was chosen. A side was roughly flattened and two parallel lines about 3 inches apart drawn along the surface : these lines were made by soaking two lengths of sinnet in a mixture of soot and water, stretching them at the required distance apart along the timber, and pressing them hard enough to imprint their stain on the white surface. The marks thus made were taken as guides and the timber shaped into what might have been taken for a 3 \times 4-inch rafter. This, again, was very elegantly trimmed to a triangular shape, its cross-section being an isosceles triangle on a base of 3 inches (Fig. 1(a)).

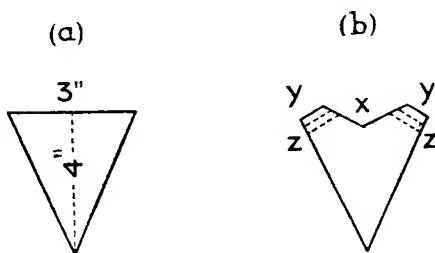


FIG. 1.

(a) SECTION OF KEEL IN PREPARATION.

(b) SECTION OF FINISHED KEEL.

x BILGE GROOVE.*yy* BEVELS FOR ACCOMMODATING EDGES OF GARBOARD STRAKES.*zz* HOLES PIERCED TO TAKE SINNET LASHINGS FOR SECURING GARBOARD STRAKES.

A groove 2 in. wide and $\frac{3}{4}$ in. deep was then chipped along the middle of the 3 in. surface from end to end of the timber. This was to be the bilge of the canoe : its containing edges, which were destined to take the garboard strakes, were bevelled away outwards at an angle of about 25°. Fig. 1(b) is a cross-section of the finished keel.

The stems were next dealt with. Two knees of *calophyllum* approximately the same in curvature had been chosen for these parts. They were first roughly trimmed down to a triangular section, so that they looked more or less like sharply-curved knife blades with cutting edges outward : during this process they were constantly

laid one on the other to compare their general contours, until at last they were very well matched in shape. At this stage they were a good deal thicker than the finished keel. They were then taken individually by the master-builder himself, and with infinite care were brought to the shape portrayed in the following figure (Fig. 2). Adze and rasp were the only tools used.

As the purposes of this finished product are not quite obvious at first sight, I shall here explain its mechanics by reference to the diagram :—

X is the proximal end of the stem, *i.e.* that which joins the keel : the proximal arm XZ is to be regarded as a linear continuation of the keel proper, the curve at Z being the foot or cutwater, and the distal arm ZY the prow of the vessel ;

a is a continuation of the bilge-groove noted in describing the keel :

b, b is a continuation of the bevel of the keel, whereon the edge of the garboard strake of the hull will sit :

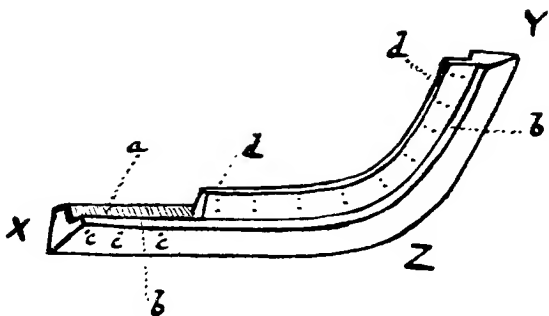


FIG. 2.—FINISHED STEM.

c, c, c are holes to take the sinnet lashings, which will hold the garboard strake in position : these holes continue up the proximal arm of the stem only so far as the bilge-groove is carried. By the foot and prow a different method of lashing is used for the sake of extra strength.

d, d is a tongue of solid timber running between the bevels on either side of the stem. When the garboard strakes sit on the bevels, this tongue forms a very solid backing : it is pierced with holes in pairs, as shown, from side to side. The planks of the hull are correspondingly pierced, and lashed in place with sinnet.

It may here be added that there is no hard-and-fast rule governing the precise curvature or length overall of the stems. The former depends very much on the shape of the best knees available as they grow on the hardwood trees of the island, the latter on the length of the keel obtainable. The ambition of my old friend was to avoid building up his keel of several short pieces, as sometimes has to be done in

these islands of small and twisted trees. And his crowning desire was to have the keel so long that in a four-fathom canoe it should constitute three-quarters of the total length. This was the ideal inherited from his grand-sires. His working-formula, therefore, seems to have been that the stems should not carry more than one-eighth each of the vessels' total length. But he informed me that he would have been prepared to lengthen them by three hands each, along the proximal arms, if the keel had been shorter than it was.

The measurements used in all this work were taken from parts of the human body, as usual among Pacific races. But it is worth noting that for consistency's sake they were taken from the body of a single man—the grey-beard himself, whose title, *te tia-b-i-re*, the *measurer*, indicated his functions. The standards were as follows :—

Te ari-ni-bai : “ The quick of the nail.” i.e. the *breadth* of the “ half-moon ” on the old man's digital nail, from side to side.

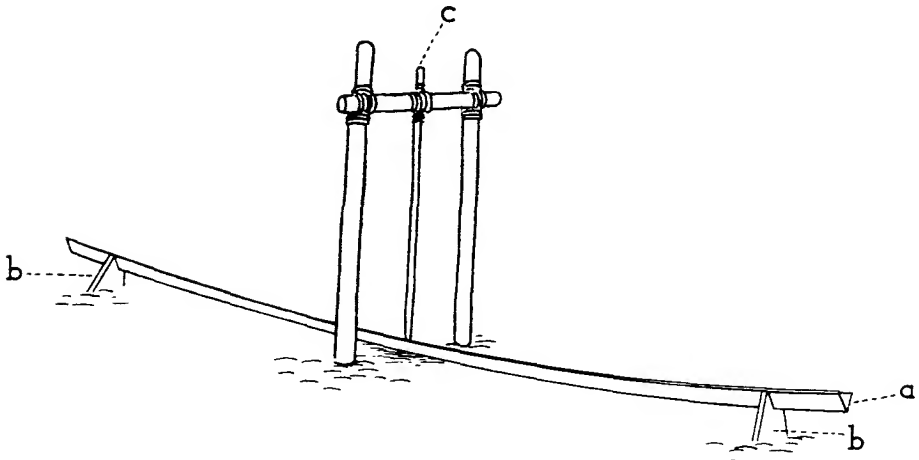


FIG. 3.—KEEL IN POSITION.

<i>a</i>	...	...	KEEL.
<i>b b</i>	...	...	CHAIR- WITH V-SHAPED NICKS, IN WHICH KEEL SITS.
<i>c</i>	...	...	PIN BY WHICH MIDDLE OF KEEL IS DEPRESSED.

Te uki-ni-bai : “ The finger-nail ” or the *breadth* of the finger-end.

Te tabo-ni-bai : “ The finger's length ” (middle finger).

Te rau-rau-ni-bai : “ The hand's length ” from tip of middle finger to crease at join of palm and wrist.

Te manoku : “ The crook ” : length from tip of middle finger to crook of elbow inside.

Te anga-anga : “ The shoulder ” : finger-tip to shoulder.

Te bwenana-te-aomata : “ The division of a man ” : from middle finger-tip to depression between breasts.

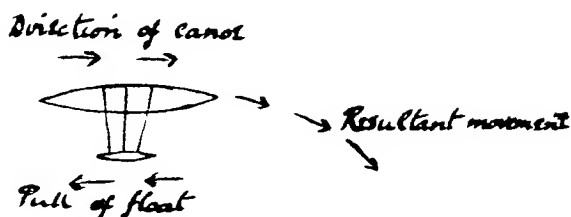
Te anga-anga-uona : “ The two shoulders ” : from finger-tip to opposite shoulder.

Te manokū-uoua: "The two crooks": from finger-tip to crook of opposite elbow.

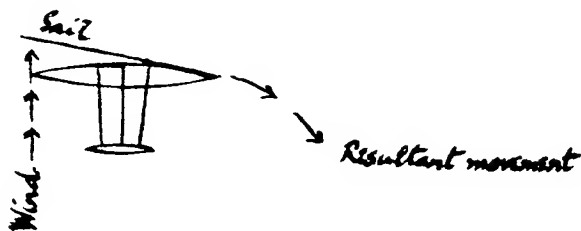
Te nja: "The fathom": a man's full stretch with arms extended.

The keel and stems being finished, they had now to be set up before any further work on the canoe could be done. Two stakes were first driven into the ground under the ridge-pole of the work-shop at a distance of "two fathoms and half a man" (i.e. about 15 ft.) apart, until they protruded about nine inches from the floor. In their tops were then cut deep V-shaped notches, so that the keel could sit comfortably in and across them with its sharp lower edge five or six inches clear of the ground. When in this position it projected about 18 in. at either end from its chairs. Its middle was then depressed to floor-level and kept there by a pin on a stout framework, as shown in Fig. 3, so that it assumed the shape of a gently-curved bow.

But a very important fact in the building of the craft must here be noted. The keel was on no account bent *straight* downwards; it was bent *obliquely* so that its middle point rested on a spot some 4 in. to the side of the centre line between the chairs. This lateral bend is one of the most important points in Gilbertese canoe-building, for it essentially concerns the navigability of the finished craft. Here are two of the reasons: first, the float of a single-outrigger canoe, when resting in the water, naturally exerts a retarding pull on one side, and thus tends to drag the craft round in a circle, thus:—

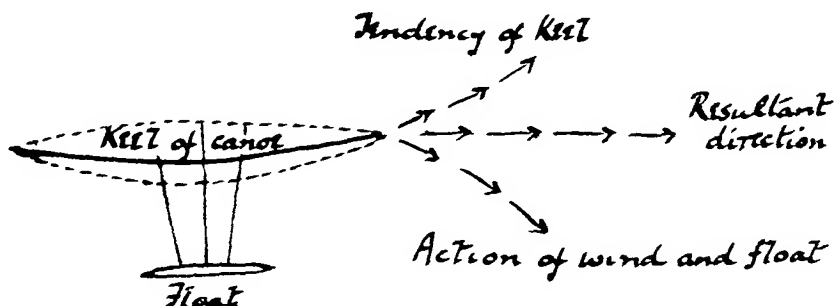


Secondly, when the vessel heels to a good breeze and the float rises from the water, the thrust of the long-boomed sail raking away aft constantly tends to luff her. In this case again, as the outrigger is always kept to windward, the movement of the canoe is in a circle around the float, thus:—



To counterbalance the pull of the float and the thrust of the sail, the ends of the canoe's keel are therefore curved *away* from the outrigger. This is achieved in the

laying of the keel, by bending it laterally and pinning it down somewhat out of the true centre line, as I have described. The following diagram illustrates the neutralisation effected :—



By native standards, a well-built canoe should travel perfectly straight when given a push with its float awash : if it does this, it will answer to the lightest touch of the steering oar when the outrigger and float lift to a full sail.

It is this lateral curvature of the keel which gives all Gilbertese canoes a "lop-sided" appearance, for of course it profoundly affects the shape of the hull. While the side away from the outrigger (*i.e.* always the lee side) is nearly flat, and comparable to the string of a bow between the outward-turning stems, the outrigger (or windward) side is rather more fully curved than the keel itself.

I do not think that this very vital and characteristic asymmetry has been explained before, though it has been noted by observers of canoe-building in Polynesia and Indonesia. It would be interesting and instructive to find out whether it is always accompanied by a particular variety of outrigger, or associated with some specific methods of attaching the outrigger-float.

The master-builder took three full days to adjust that lateral curve, and to talk about it. So then they began to fit the stems to the keel. Fig. 4 shows the stool and the upright stake with which each was provided to keep it in place. The end-to-end join *d* was a slow affair. First the extremities to be brought together were rasped down until they fitted pretty closely. Then the end of the keel was finished off with rasp and "emery-paper" of fish-skin until it almost acquired a polish. After this it was blackened with soot and the clean butt of the stem was clapped against it. Wherever the soot stuck to the white wood a rugosity was indicated : this was rasped away and the trail by soot again made—and so on, the black transfer becoming larger and larger as contact grew more perfect, until at last the union of the two faces left an unbroken coating of soot on the stem's butt. This done, the stem and keel were pierced, each in two places, from side to side and at about half an inch from the intended joint. By two lashings of three-ply sinnet through the holes thus provided the stem was made fast to the keel and supported as shown in the diagram. A caulking was used at the joint in the shape of sun-dried pandanus-leaf, which was first chewed until quite soft and then steeped in coconut oil. The beds

of the lashings, which held together the component parts, were very carefully counter-sunk in the timber so that the sinnet might lie safely protected from all abrasion; this device was used later in every joint that was made in the hull, not only because protruding sinnet would have been liable to damage, but also because it would have been considered to impair the speed of the craft.

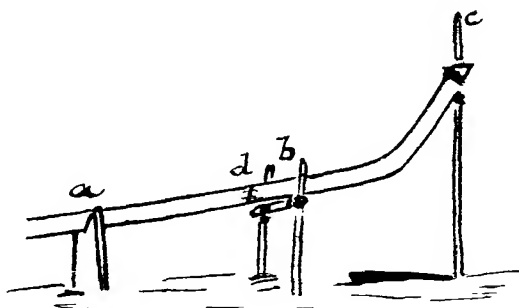


FIG. 4.—STEM IN POSITION.

- | | | | |
|----------|-----|-----|---|
| <i>a</i> | ... | ... | STOOL OF KEEL. |
| <i>b</i> | ... | ... | CROSSBAR SUPPORTING STEM WHERE IT JOINS KEEL. |
| <i>c</i> | ... | ... | STAKE HOLDING STEM IN VERTICAL POSITION. |
| <i>d</i> | ... | ... | END-TO-END JOINT OF KEEL AND STEM SECURED BY SINNET LASHINGS. |

Fig. 5 illustrates the appearance of keel and stems when fully set up. For the purpose of comparing the relative heights of the stems when lashed in place, a length of sinnet was drawn tightly between their tips, as shown in the figure, and adjust-

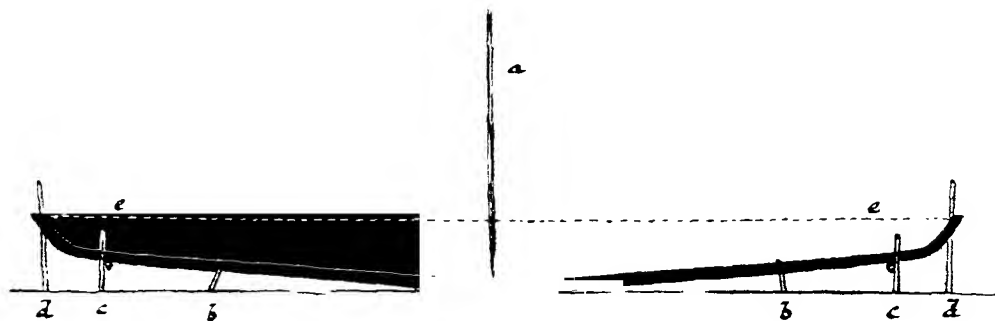


FIG. 5.

- | | | | |
|------------|-----|-----|---|
| <i>a</i> | ... | ... | CENTRAL PIN HOLDING KEEL IN POSITION. |
| <i>b b</i> | ... | ... | CHAIRS SUPPORTING ENDS OF KEEL. |
| <i>c c</i> | ... | ... | STOOLS SUPPORTING STEMS AT JUNCTION WITH KEEL. |
| <i>d d</i> | ... | ... | STAKES HOLDING STEMS VERTICAL. |
| <i>e e</i> | ... | ... | STRING STRETCHED FROM TIP TO TIP, TO GAUGE RELATIVE HEIGHTS AND REPRESENT GUNWALE LINE. |

ments were made by eye. The stretched string was allowed to remain as a guide to the gunwale line of the craft.

The hull was now to be built up on keel and stems. "Planks first, ribs after" was the rule followed, which is precisely contrary to the methods of European ship-building.

One of the now seasoned planks was cut into two six-foot lengths, and these were dressed down to a thickness of about $\frac{5}{8}$ inch. These were destined for the *buaka*, i.e. that part of the garboard strake which lies in the very middle of the keel. Work proceeded now on both sides of the vessel at once. Fig. 6 shows more clearly than many words how the strakes were coaxed to sit on their bevels.

Particularly to be noted in this figure is the cross-piece *d* which is used to regulate the splay of the hull's sides. This cross-piece has its arm, which projects on the out-

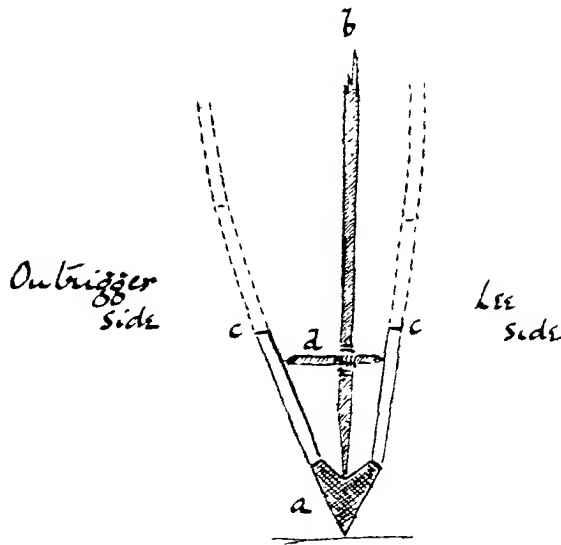


FIG. 6.

<i>a</i>	...	...	SECTION OF KEEL.
<i>b</i>	...	...	PIN HOLDING CENTRE OF KEEL TO GROUND.
<i>c c</i>	...	...	GARBOARD STRAKES IN POSITION.
<i>d</i>	...	...	CROSS-PIECE ACTING AS A STOP TO REGULATE THE SPLAY OF THE STRAKES.

rigger side a good deal longer than that to leeward. This results in giving a sharper outward lean to the windward strake than to the leeward one and carries into the hull of the craft that asymmetry which has been noticed in the keel.

To secure the strakes to the keel, they were pierced along their lower edges at intervals of about a foot, and lashed with sinnet to the bevels which had been bored as shown in Fig. 1 (*b*). A caulking of chewed and oiled pandanus-leaf was used at this seam, as at all others in the hull.

The second and third planks laid were those on either side of the middle. The end-to-end joins were made with exceeding care, though they were not necessarily

vertical (see Fig. 7). Several of them were reinforced later by backing them with small slabs of wood "sewn on" right through the hull. Fig. 7 shows how the gar-board strake was built up of small pieces, which followed the curve of the stems right up to the gunwale line.

So, tier by tier, the planks were laid on until the hull was complete. When gunwale line was reached, the edges were trimmed straight, on a level with the string which was stretched between the stems.

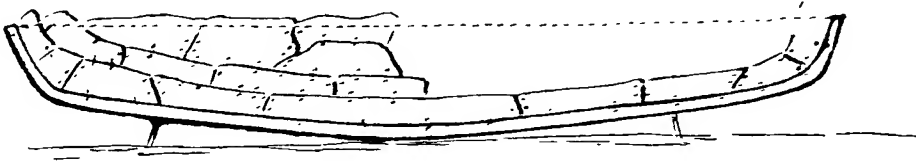


FIG. 7.—HULL IN PROCESS OF CONSTRUCTION. NOTE HOW TIERS OF PLANKS FOLLOW CURVE OF THE STEM. THE DOTTED LINE IS GUNWALE LEVEL.

At this stage the cheeks of the craft were quite flexible, consisting of mere patches of wood sewn together on the framework of stems and keel. Before the ribs were put in it was necessary to give the hull something like its final shape. This was done, at the old man's directions, by pushing out the cheeks where necessary and wedging them in position by short cross-pieces inside the hull: or by pushing in the sides at other places and lashing them in place across the hull through holes bored



FIG. 8.—A CANOE RIB.

for the purpose. When the hull was thus rendered symmetrical, the ribs were shaped (Fig. 8) and put in (Fig. 9) at intervals of about 20 inches along each side, being secured by lashings through the planks of the hull. The several steps which followed the adjustment of the ribs are also illustrated in Fig. 9, *a, a* being a pair of ribs: *b, b* is a thwart lashed beside them. Such thwarts are fixed at the side of every pair of

ribs in the craft, being countersunk in the hull so that their top surfaces are flush with the gunwale line.

It will be noticed that the ribs *a, a* project slightly above the edge of the hull : outboard and inboard of these projections, and made fast to them by lashing, are served wands or poles of tough wood from end to end of the canoe. These are seen

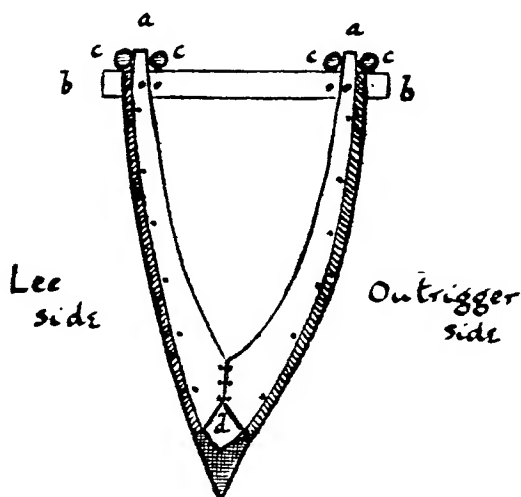


FIG. 9.—RIBS, *a a*, IN POSITION. SEE TEXT FOR FURTHER EXPLANATION.

in section at *c, c, c, c*, and form the gunwale. Sometimes the thwarts are lengthened outboard on the lee side, so that they will accommodate several of these poles side by side, which thus form a sort of dashboard when the vessel heels. Note at *d* in the figure the triangular space left at the base of the united ribs to allow the passage of bilge-water.

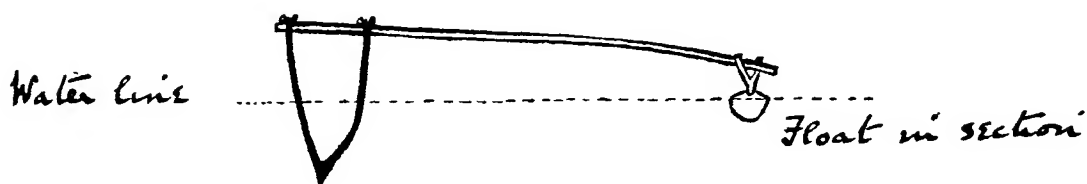


FIG. 10.—THIS DIAGRAM SHOWS THE CURVATURE OF THE OUTRIGGER UPWARDS FROM THE FLOAT.

When the thwarts had been lashed in place the hull had gone as far as it might until the outrigger booms were fixed. There were three of these. Their proximal ends took the place of thwarts amidships, up against the three middle pairs of ribs. In form they were not quite straight, having been curved gently in the trimming so that their distal (*i.e.* outboard) ends drooped downwards, as shown in Fig. 10. If thus arched the booms are less likely to foul the crests of waves by the float in choppy seas. Fig. 10 is also intended to illustrate the slight list of the hull to windward when the float rides in the water. The vessel is only on an even keel when, on

a smart breeze, she lifts the float out of the sea ; her ideal sailing angle is with the float about 2 feet clear of the water.

As set in the hull, the outrigger booms were parallel to each other, but their distal ends were afterwards pulled together, so that they converged towards the float (see Fig. 11 at *a, a, a*). By reference to Fig. 11 we may now follow the processes by which the outrigger was finished and braced up to the hull.

Across the three booms, ladderwise, were first lashed six transverse battens, at intervals of about 18 inches, from gunwale to distal end (*b, b, b, b* on figure). From the ends of the hull to the middle of the central boom were then laid two braces, *c c, c c*. Wherever these traversed another timber they were made fast with sinnet lashings : note particularly how the thwarts of the vessel had been extended out-board to answer this purpose. Next in order came the second pair of braces, *d d, d d*, which met at the extreme end of the central boom, while their proximal extremities were made fast at the lee gunwale, some 2 feet down from the stems.

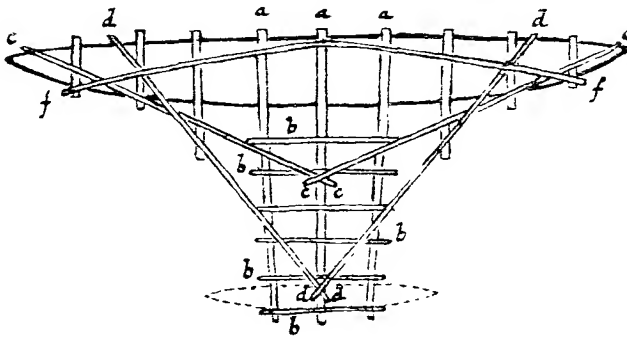


FIG. 11.

When this system of braces was complete it enormously stiffened both hull and outrigger, making any lateral play of the booms almost impossible. The interlacing triangles formed at the stems, where the braces traversed the hull, were pointed out as essential features by the old master-builder ; and, as a final stiffener to the hull, he added the curved brace, *ff*, which by crossing and recrossing the thwarts from windward to lee side, all along the hull, and by being lashed wherever it passed over another timber, made a very rigid affair of the little craft. In a secondary sense, this criss-cross of timbers was a useful adjunct to the vessel, for it formed a deck easily gripped by bare feet during the manœuvres of navigation.

Now came the important business of preparing the outrigger float. None of the local timbers are buoyant enough to support the weight of the heavy booms, and so before the various woods of the civilised world were imported it was a difficult thing to procure a good log. The east and south-east Trades do, however, bring over from the American littoral, thousands of miles away, occasional jetsam of cedar and pine, and the westerly gales cast up casual treasures from Melanesia and the Caroline

Islands. These were eagerly sought upon the foreshore, and a lucky finder would cherish a log for years against the day when he might need a new float. My old friend had a piece of cedar which he had inherited from his father, and which had been preserved from white ant by oiling and smoking. The heart of this log was quite

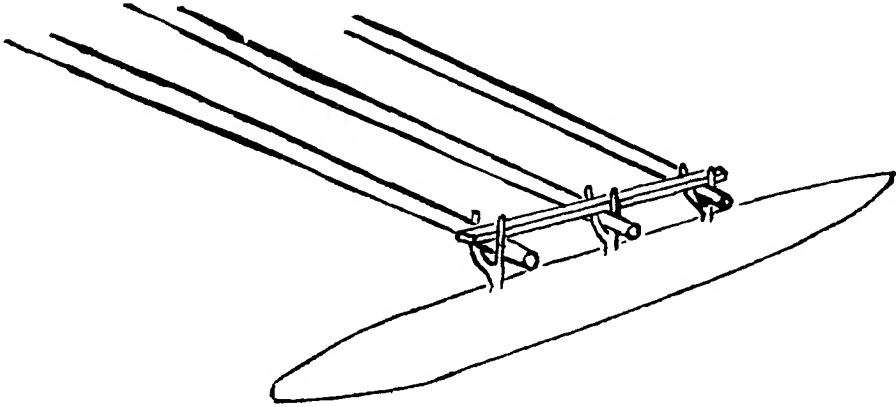


FIG. 12.—ATTACHMENT OF FLOAT TO OUTRIGGER. FOR THE SAKE OF CLEARNESS, LASHINGS HAVE BEEN OMITTED.

sound, and out of it was made a more or less cigar-shaped float, as pictured in Fig. 12, having a length of 10 feet 7 inches and a circumference amidships of 23 inches. The under surface of the float at either end was given a rather sharper tilt towards the point than the overside, and was also flattened for about 18 inches, so that it might rise quickly when submerged.

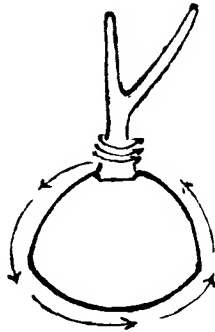


FIG. 13.—METHOD OF SECURING OUTRIGGER ATTACHMENT TO FLOAT. THE ARROWS INDICATE LASHING.

Attachment of float to outrigger was made with Y-shaped natural prongs of *te engra* (*Pemphis acidula*), an exceedingly hard timber (see Fig. 12). The prongs were trimmed so as to have a good broad base, from which they tapered to the waist. Shallow seats in which the bases might sit were countersunk (not more than $\frac{1}{4}$ inch deep) in the overside of the float, and the prongs were lashed secure, as shown in Fig. 13. The taper of their butts from base to waist prevented the lashing from slipping.

Had work on the craft now ceased, it would have been in a fit state, after a complete anointment of the hull with coconut oil, for launching and for use as a paddling canoe. Fig. 14, though it does not show gunwale poles or all the braces described above, gives a fair general idea of its appearance at this stage.

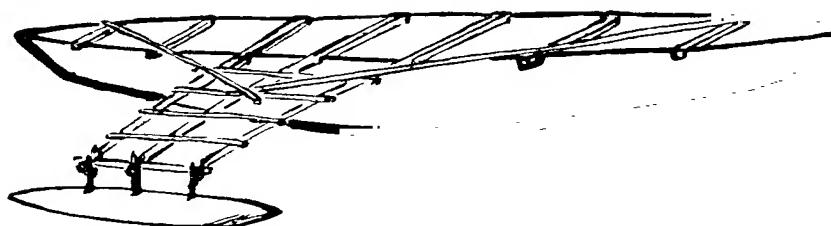


FIG. 14.—GENERAL APPEARANCE OF PADDLING CANOE. CERTAIN DETAILS OMITTED.

The following are the specifications of the vessel :—

Length over all, 24 feet 2 inches.

Beam amidships, 21 inches.

Depth amidships, 2 feet 7 inches.

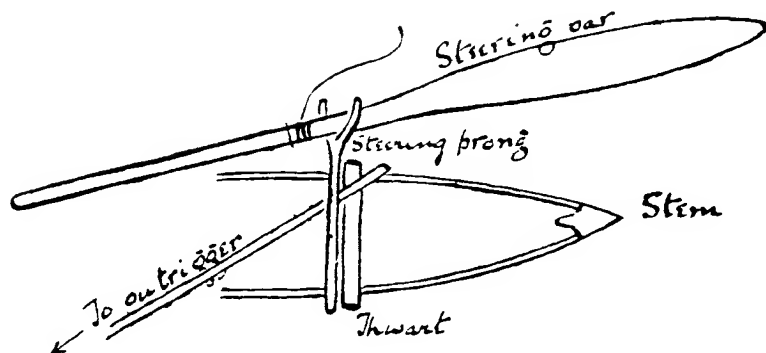
Length of outrigger booms (outboard), 10 feet 2 inches.

Length of outrigger float, 10 feet 7 inches.

Circumference of float, at middle, 23 inches.

But as the canoe was destined for sailing, several other parts had now to be added. These were : purchases, at either end, for the steering oar ; steps, at either end, for the gaff or sprit of the three-cornered sail : and a step amidships for the mast.

The purchases for the steering-oar were Y-shaped prongs of *fragraea* timber lashed athwartships, at about 20 inches down from either stem, thus :—



When the vessel is under sail the steering oar is firmly lashed between the prongs, and it generally has a piece of fibre rope attached to it for the purpose.

The mast-step was a slab of wood about 10 inches long and 6 wide, set inboard right up against the windward gunwale and supported by the three outrigger booms.

In this plank were countersunk five round, shallow sockets, of which the middle one was directly over the central boom. The butt of the mast might rest in any one of these sockets, as desired (Fig. 15).

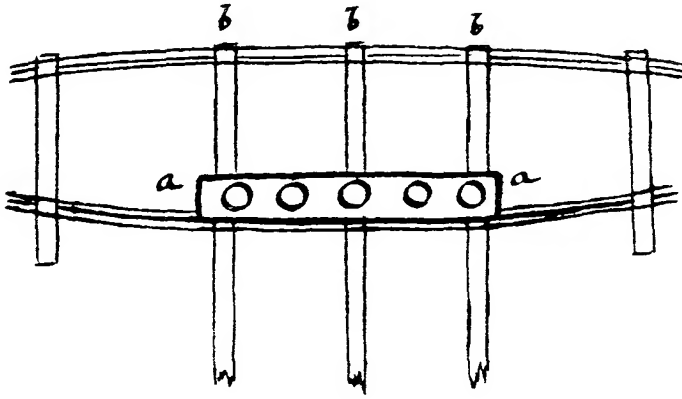
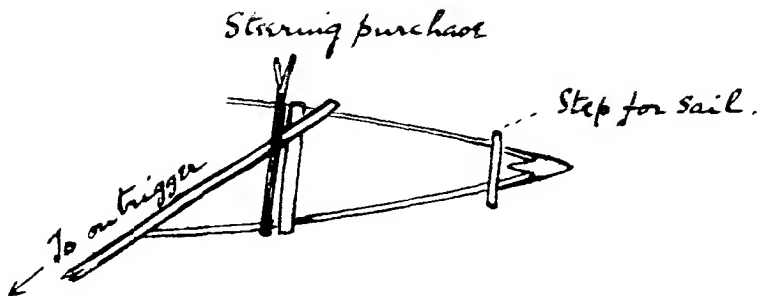


FIG. 15.—POSITION OF MAST-STEP OVER OUTRIGGER BOOMS UP AGAINST WINDWARD GUNWALE.

" " MAST-STEP.
 b b b OUTRIGGER BOOMS.

The steps for the sail, at either end of the hull, were simply thick pencils of wood lashed athwart the bows, thus :—



Astraddle of these steps sat the butt end of the gaff or sprit, in which a V-shaped notch had been nicked for the purpose. Diagram 16 illustrates the uses of the steps above described.

It will be seen from the figure that to elevate or depress the peak of the sail when set, it is only necessary to step the mast in a forward socket or an after one, as the case may be.

The hull was now finished. It remained to make the spats and sail. Fig. 15 shows how these were set, but the size of sail indicated therein would be considered so small as to be only suitable for fishing. The photograph in Fig. 2, Pl. XXI, illustrates the spread of canvas used on racing-craft. The proportions observed by the sail-maker in fitting a canoe with a racing suit are as follows :—

(a) The boom should be by one fathom longer than the hull ;

- (b) The sprit should be equal in length with the hull ;
- (c) The mast should be equal to three-quarters of the hull's length ;
- (d) The leach of the sail should be equal in length to the luff.

The ideal sail is therefore an isosceles triangle, or, rather, would be such, were it not for the outward curve that is given to its edges in the cutting.

The spars are generally made of seasoned coconut timber, trimmed square, and as thin as possible ; but I have seen other native woods used. When it is impossible

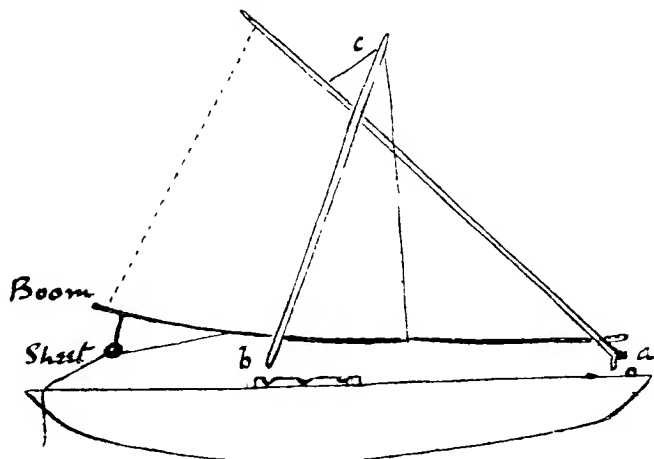
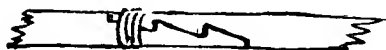


FIG. 16.—SIDE ELEVATION OF HULL AND SPARS.

- | | | | |
|---|-----|-----|---|
| a | ... | ... | NOTCHED OR PRONGED END OF SPRIT ABOUT TO SIT ON STEP. |
| b | ... | ... | TAPERED END OF MAST ABOUT TO SIT IN AFTER STEP. |
| c | ... | ... | PEAK HALYARD FOR RAISING SAIL, SERVED THROUGH A HOLE PIERCED IN MAST. |
- THE BUTTS OF THE SPARS ARE PROVIDED WITH LASHINGS, FOR MAKING FAST.

to obtain a single piece long enough for its purpose, two, or even three, lengths are spliced together with the joint depicted below. I have seen natives make such joints in a few minutes with an adze, without any preliminary measurement whatever.



In the old days, of course, the sail had to be made of native material, which consisted of pandanus-leaf. The leaf was first bleached by alternately soaking it in sea-water and drying it in the sun, for about a week altogether. It was then pounded with heavy pestles against a smooth convex wooden surface, until it became soft and flexible. In this condition its outer surfaces were easily peeled away from each other. These were scraped and trimmed into strips some 30 inches long by 3 broad, and the strips were sewn together, edge to edge and end to end, until the required area of sail was achieved. The thread for sewing was made of the fibrous portion

of the pandanus-root: the stitch used, the ordinary tacking stitch: edges were bound with doubled leaf, and sometimes sinnet was whipped on for extra strength. Such sails were beautifully light, and very durable if kept well rubbed with coconut oil: being oiled, they had the great advantage of drying quickly if the canoe happened to capsize. But such was the labour entailed in their making, that for the larger craft ordinary matting was often used instead. Nowadays no native will use anything but canvas.

When mast, sprit, boom, and sail were done, the rigging and tackle were soon supplied: these were:—

- (a) A fore and aft stay for the mast, made fast to the endmost thwarts of the vessel;

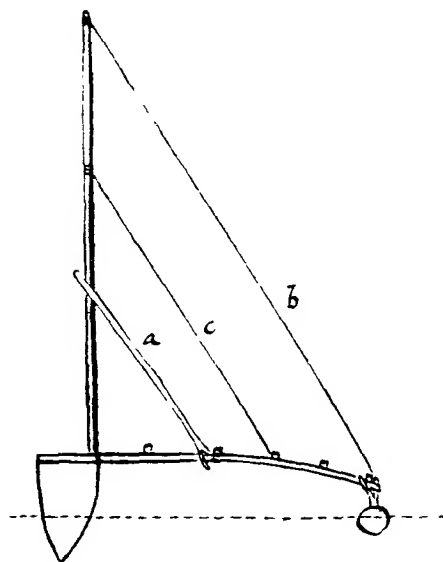


FIG. 17.

<i>a</i>	...	...	PRONGED STICK BRACING MAST.
<i>b</i>	...	...	ONE OF A PAIR OF STAYS FROM OUTRIGGER TO MASTHEAD.
<i>c</i>	...	...	AUXILIARY STAY SOMETIMES USED.

- (b) Two stout stays from masthead to outrigger (Fig. 17):
 (c) A halyard for the sail, served through the masthead (Fig. 16);
 (d) A single sheet for the sail.

The sheet was not bent direct to the boom, but to a thimble of hardwood which was threaded on a loop from the boom (Fig. 16). Sometimes the peak halyard and the fore and aft mast-stays are also served through such thimbles, which answer the purpose of blocks. Last of all, a pronged stick was provided as a support for the mast, as depicted in Fig. 17 at *a*.

This brace to the mast is not always considered necessary, as the mast has no tendency to fall towards the outrigger (*i.e.* windward) side when the sail is set, while the stay from its head to the float prevents it from collapsing to leeward.

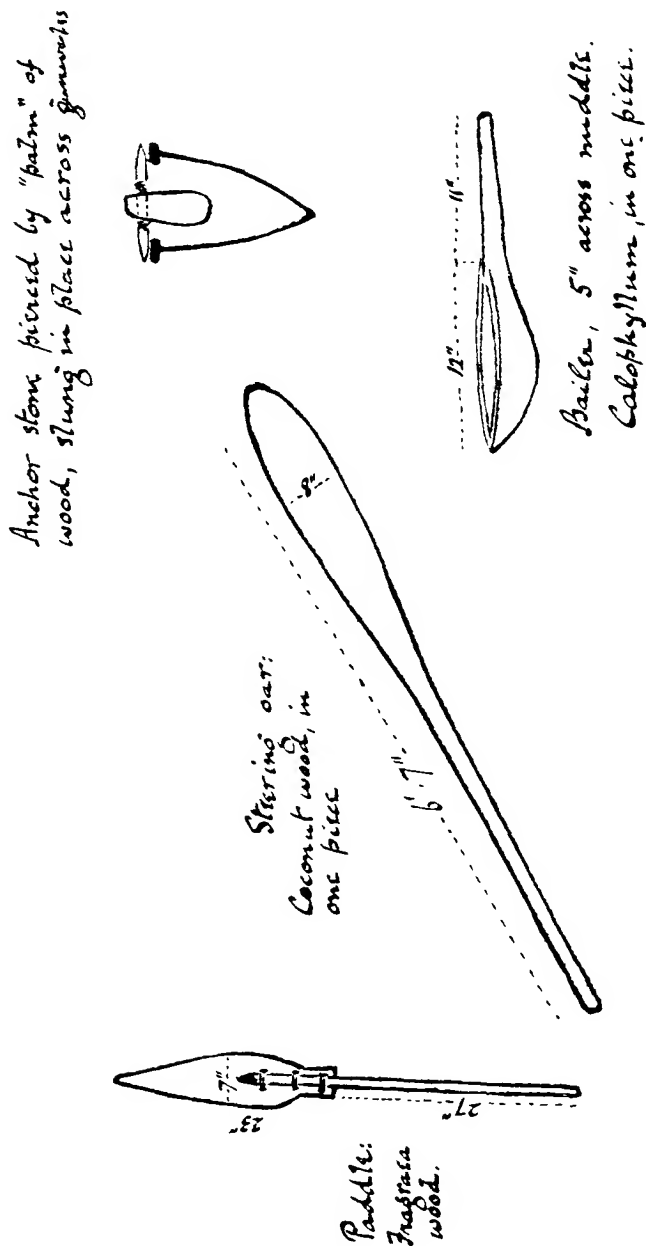


FIG. 18.

The canoe was now rigged. The accessories provided were two paddles, a steering-oar, an anchor, and a bailer, as pictured in Fig. 18, and also a 12-ft. pole to

punt her when the sail was furled. This "quanting-pole" was slung, when not in use, along the windward gunwale, outboard and under the outrigger.

So, at last, after four months' steady work, the craft was ready for launching. To help preserve her timbers she was given several coats of boiled coconut oil, well rubbed in, before she was moved from her stocks. The actual launching was a matter of some anxiety to the old man, for he said that, as his craft was intended for fishing, it was necessary to keep its maiden trip *secret from the fish*. According to Gilbertese belief, the fish have a watchful agent ashore in the person of the sea-louse (Gilb., *na-tutune*); this small creature spies on the movements of fishermen, and swims out to warn his friends whenever a canoe is carried to the water's edge (where he lives) for launching. But, if the vessel is launched at night, when he is asleep, and then left moored a little offshore, the fish will get no warning.

The origin of the belief that the sea-louse is the fish's ally lies, I think, in the fact that it is often found in the mouth of a catch. I have seen it several times in the mouths of flying-fish.

The canoe was, therefore, not launched until night had fallen. When the time approached, the old man, with his four sons, stood in a row alongside the lee gunwale of the craft, and waited there for a few minutes in silence. They were pausing thus in the darkness until the master-builder should mutter the final spell by which the canoe should be prepared for its busy career. Presently he broke into the following incantation, his voice rising scarcely above a mutter :—

Aikou-a-a-i-o mangarai, mangarai,

Nkoe one Na Bakou nako-iu !

Wa-u n akawa awo-e-e-ie !

Ko taraia, ao ko noria-e-o !

Ko taraia, ao ko noria,

E koro i nano-ni bareaka-ma,

Ko taraia, ao ko noria,

Do not interfere, interfere.

Thou, Sir Shark,¹ with me !

My-canoe for fishing this !

Thou watchest it, and thou seest it !

Thou watchest it, and thou seest it.

It is ashore inside its shed,²

Thou watchest it, and thou seest it.

When this was said three times, the old man took three green coconuts and placed them in the hull, one at either end and one in the middle. These were to remain aboard all night, to provide food for any predatory spirits who, if left hungry, might eat the strength out of the canoe.

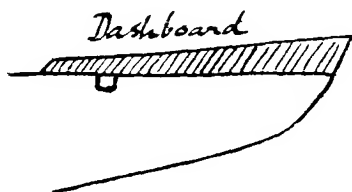
Then, out of the darkness of the shed and under the star-glimmer, the five men carried the vessel very silently to the water's edge. They put her down in the shallows just offshore and left her anchored until the morning.

¹ *Bakou* = shark, but it is a generic name for all dangerous fish. It is probably used here in its wider sense.

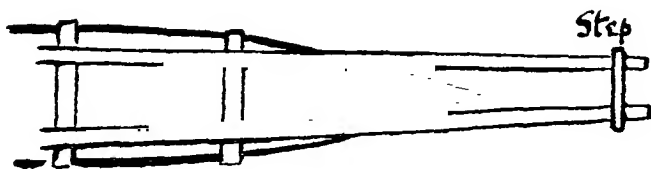
² *Bareaka* = shed. The Gilbertese word is plainly Polynesian in derivation: *fale*, house; *vaka*, canoe.

II.—VARIANT TYPES.

(i) The craft which I have described was perfectly flush along the gunwale line from stem to stem: in technical terms, it had no shearing. But in many Gilbertese canoes the stems are seen to be appreciably higher than the deck amid-ships. This shearing is achieved either by giving the planks of the hull itself at gunwale line a downward curve back from the stem, or (more often) by adding *karetaba* (or dashboards) fore and aft, thus:—



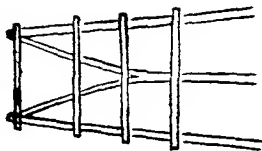
(ii) When a large racing sail is being made the canoe-master sometimes fears that the great length of boom, carrying the canvas right away aft, will make her hard on the tiller. He therefore manages to step the sail farther forward by throwing out a sort of bowsprit on which it may rest. Thus the press of sail abaft the outrigger is reduced. One of these bowsprits may be seen in Fig. 2. Pl. XXI; the following diagram illustrates its construction:—



(iii) It has already been suggested that the number of outrigger booms provided depends upon the size of the craft. The large vessel shown in Fig. 1. Pl. XXI, has five: a small paddling canoe has only two. Three is by far the most usual number, probably because the medium-sized craft is nowadays in vogue.

Wands or poles of moderate thickness are sometimes served along the outside booms of the outriggers; also, on fishing canoes especially, a platform of wands set side by side is made over the booms by the weather gunwale.

The three-boom outrigger is sometimes varied by splitting the middle boom to about half-way back towards the hull, and curving the ends away to the outside booms, thus:—



(iv) Floats vary considerably in shape. The torpedo form is most patronised, and this is the one I have described. But note another shape in Fig. 1. Pl. XXI. Here the float has a flat deck, which is curved upwards towards the ends: its underside is

rounded in the middle like a fish's belly, but flattens gently towards the shovel-points.

(v) The method above described of attaching float to outrigger is by far the most common in the Group, but on the islands of Nonouti and Tabitenea I have seen another mode (Fig. 19) which entirely changes the structure of the outrigger.

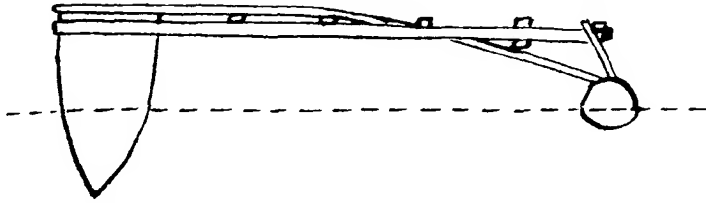
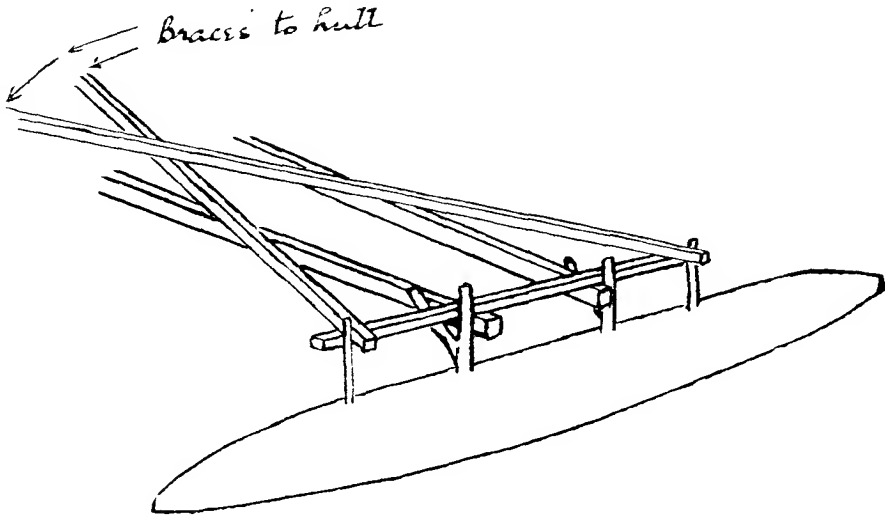


FIG. 19.—FORM OF OUTRIGGER AND FLOAT-ATTACHMENT SOMETIMES SEEN IN CENTRAL GILBERTS.

This form is, I think, similar to that pictured from the Gilbert islands by Dr. Haddon in his monograph on "The Outriggers of Indonesian Canoes." It should be borne in mind, however, that the type is very far from being common in the Group.

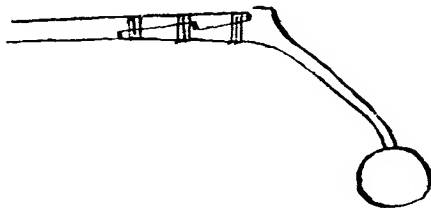
On Tarawa I have seen the composite form of float-attachment pictured in Fig. 3, Pl. XXI, and shown in rather better detail in the accompanying sketch. In this illustration the transverse battens on the outrigger and all the lashings have been omitted, for the sake of greater clearness. Two outrigger booms only are shown,



because, though a third is sometimes used, two is the usual number accompanying this method of float-attachment, even on the larger canoes. It is noticeable, too, that when a third is inserted it is *never* accompanied by a third prong-attachment to the float. The prongs, two in number, are lashed to the float in the manner already described, being made fast above to the outer booms of the outrigger (when more than two of these are used). The auxiliary attachments are not lashed to the float, being driven into holes bored to receive them and wedged firm with small chips

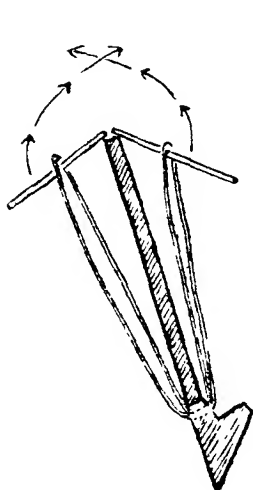
of wood. At their upper ends they are made fast with sinnet to the outermost transverse batten of the outrigger, whose ends are produced, as pictured, on either side of the booms, to accommodate them. In order to strengthen the protruding batten, the braces from the hull are brought across to meet it as seen in the sketch.

In the extreme southerly islands of the Group—Tamana, Arorae and Nikunau—where there are no lagoons and no longer any sailing canoes, I have seen outrigger attachments exactly similar to the Ellice Island type pictured by Hedley from Funafuti.¹ The accompanying sketch illustrates the type.



This local affinity with the Ellice Islands is not surprising, in view of the proximity of the Southern Gilberts to the northern atolls of that Group. The craft provided with the attachment pictured were frail paddling canoes of the slab-built, double-ended type described in this paper, and therefore quite unlike the Ellice dug-out, stem and stern variety. But on the island of Banaba, much farther away from the Ellice Group, both hulls and float attachments assimilate closely to those pictured by Hedley from Funafuti.

(vi) On Beru and Abemama I have seen the device shown in the two accompanying diagrams used to keep a plank of the hull in position while it is being lashed



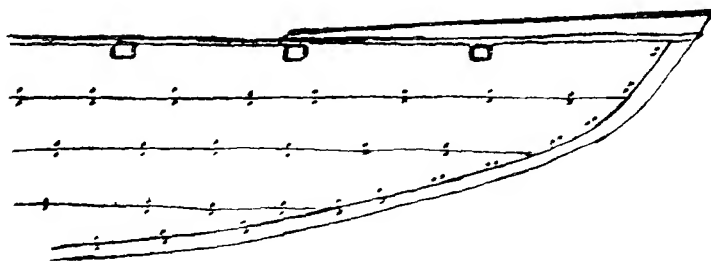
to that below it. Through one of the holes bored in the edge upon which it is to sit a loop is passed, and two short sticks are used to lever the ends of the loop over the edges of the plank, as shown in (a). The sticks are then crossed as in (b) to

¹ Hedley, "Memoir III of the Australian Museum, Sydney," Part 4, Plate XV.

prevent their slipping back. With two or three of these improvised vices a plank sits quite firm, leaving both hands of a worker free for lashing. I have not made an island to island enquiry to ascertain the distribution of this device, but I imagine it to be known pretty generally throughout the Group.

(vii) The introduction of European timber has of course greatly simplified, and, I think, improved the construction of Gilbertese canoes. But it has entirely revolutionised the old indigenous building methods, which were based upon the circumstance that nothing like a long plank could be obtained from the stunted trees of the islands. Nowadays the straight and ready-dressed boards of red-pine imported from Australia are used for the hull, and the lines of suture running fore and aft are parallel with the gunwale instead of following the curves of keel and stems. Compare the rough sketch below with Fig. 1, Pl. XXI, and the difference is obvious.

The result is naturally a craft with lines both cleaner and stronger than those of a canoe built with small slabs of wood. But even now, so conservative are some old

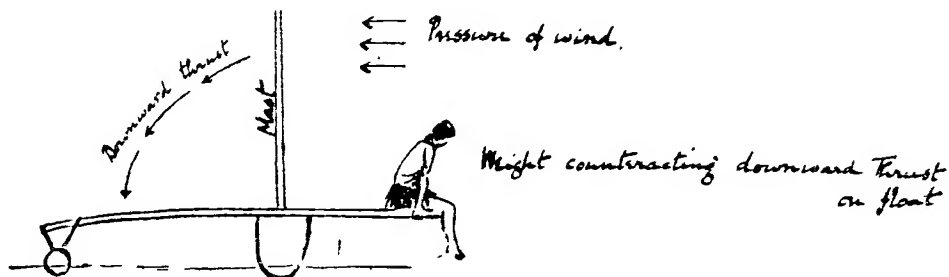


craftsmen, that they will cut the imported planks into six-foot lengths and lay these in the hull according to the ancient method.

III.—MANAGEMENT.

It stands to reason that a sailing craft of the type I am describing must keep the single outrigger always on the weather side, for if this were kept to leeward it would at once submerge under the press of the large sail: at this, the vessel would first lose way and then slowly capsize. I have, indeed, seen references to single outrigger craft in Indonesia, which are alleged to sail with the outrigger down wind. If this be true (which I doubt), I can only conceive that the timber used for the float in these canoes is buoyant enough to resist the pressure of the sail: or that the extension of the proximal ends of the outrigger booms outboard over the side opposite the float, which is common in Indonesia, is intended to give purchase to a weight (probably

some member of the crew) counteracting the downward pressure on the float. This becomes clear in the diagram :—

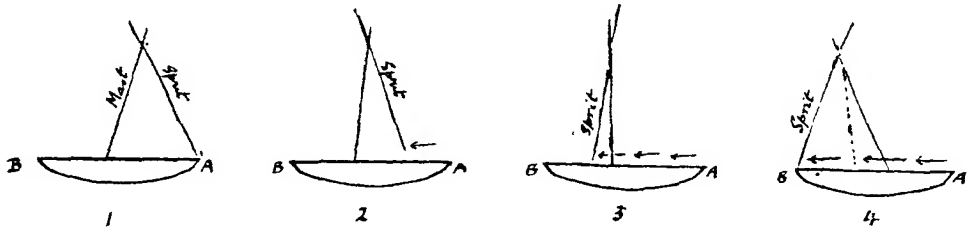


Of course, in the double-outrigger canoes of Indonesia, one of the floats must necessarily be kept to leeward, and in this case I conceive that the counteracting weight above pictured is then applied to the weather outrigger.

In a Gilbertese canoe the weight of the outrigger to windward stiffens her against the breeze in an admirable manner. The object of the sailor is so to manage his sheet that the canoe will heel enough to lift the float clear of the seas. When relieved of the very considerable drag of the float, the craft at once gathers speed, and on a good breeze seems to hurl her lean blade of a body through the water. She travels, under racing canvas, at an astonishing speed: I have myself covered 18 sea-miles on a 12-metre canoe in five minutes over the hour.

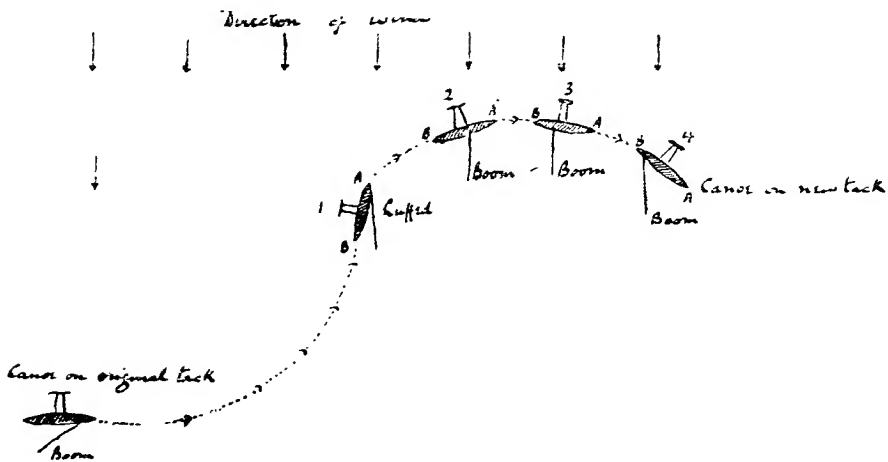
If the vessel heels too far, however, the long boom will dip into the sea on the lee side, and nothing will then prevent her from capsizing. Clean over in a semi-circle swings the outrigger and probably snaps a spar or two when it falls on the other side. To prevent such a mishap, one of the crew is set especially to watch the elevation of the float. When it rises he darts out upon the outrigger until it begins to fall again under his extra weight, and then he darts back. If he and the man at the sheet are skilful yachtsmen, they will between them keep the float swinging for miles at a stretch, never more than three feet and never less than a foot clear of the seas. Under their management the slim vessel with her frail spars and raking wings looks from afar like some enormous dragon-fly poising and swooping over the lagoon. That is, given one of those heavenly south-east breezes, which the season of Trades so prodigally lavishes on the Line Islands: but on a gusty day things are rather different. Sometimes, then, the outrigger hand has to fling himself like a cat to the very end of the booms, there to clutch a stay and lean far out over the water: then, of a sudden dies the gust: crash falls the float back into the sea, and if our friend is not very quick he will be swept off the outrigger in a second.

As the outrigger must be kept to windward, the canoe cannot go about from one tack to another as European sailing craft may do. If it is necessary to go on another tack the sail must be taken over to the other end. To anyone interested in sailing, the accompanying diagrams will explain the nature of the manœuvre "about ship."



SERIES OF DIAGRAMS SHOWING HOW THE SAIL IS CARRIED FROM END A TO END B OF THE CANOE, BY LIFTING THE SPRIT OVER. IN NO. 4, THE DOTTED LINE INDICATES THE RESULTANT POSITION OF THE MAST, WHILE THE CONTINUOUS LINE SHOWS HOW IT IS STEPPED AFT BEFORE THE CANOE PROCEEDS ON THE NEW TACK.

SAME MANŒUVRE VIEWED FROM ABOVE SHOWING HOW BOOM IS SWUNG AS SAIL GOES OVER.



With a heavy sail flapping in a smart breeze and a frail, undecked canoe underfoot in a lumpy sea, it can well be imagined how strong and skilful he must be who would venture to carry over the sprit.

Such an evolution as the above naturally reverses the ends of the craft: that which was the bow now becomes the stern, and vice versa. Hence, the double-ended construction of the Gilbertese canoe.

When there is a pretty stiff wind, the stays from outrigger to masthead are shortened, so as to give the mast a lean to windward. By thus throwing the top-weight of mast, spars and sail over to the windward side the craft is made a good deal stiffer, and will not heel so dangerously in the sharp gusts. When there is very little breeze,

the mast is given a cant over to leeward, where the weight thus thrown outboard counterbalances outrigger and float, which then ride lightly and rise easily.

On all but the largest canoes, the sheet and steering-oar are managed by one man.

IV.—SEASONS AND WEATHER SIGNS: DANGERS OF THE SEA: CANOE-NAMES: RACING.

Two constellations, the Scorpion and the Pleiades, punctuate the year for Gilbertese mariners. When the star Antares¹ is in right ascension at sunset, then begins the fair-weather season, "the day of voyaging" (*te bongi ni borau*): it lasts until the Pleiades,² appearing over the Eastern horizon with the first darkness, usher in the boisterous weather and close the travelling season. The right ascension of Antares at sunset takes place, according to my own (I am afraid, very amateurish) observations, early in June: that of the Pleiades, about the middle of November. From June to November is therefore the sailing season of the Gilbertese, while from November to June long excursions to sea are avoided. These two periods correspond pretty accurately with the season of Trade winds and the season of westerly gales respectively, as observed by European mariners in these waters.

Bad weather is particularly looked for by the Gilbertese sailor between the times when Sirius³ and α Hydrae⁴ come into right ascension at sunset, which is to say, according to my own quite possibly fallible reckoning,⁵ between the middle of January and the middle of February. It is certainly a fact that during these two months the worst gales from the west and south-west visit these islands.

When a voyage had to be made during the bad season, the navigator knew several weather signs to help him choose his day. He would watch the small red ants which infest most houses: if they were returning in numbers to their nests, laden with food, and were blocking up their doors with particles of sand, foul weather was impending: but if they swarmed out, leaving their doors wide open, it promised

¹ *Antares* (α Scorpionis), called *Rimvimaata* by the Gilbertese.

² The Pleiades are called *Ni Auti*. This constellation is believed to be the breeding ground of the common house-fly.

³ *Sirius* (α Canis Majoris), called *Babaniman*.

⁴ α *Hydrae*, called *Baikare*.

⁵ It was only at the end of my six years' residence among them that the Gilbertese old men began to render up their star-lore. Had I had a full year for my observations, I could have watched the whole firmament of stars from daily change to change: but only a few weeks were granted me. All I could therefore do was to dedicate as many wakeful nights as a hard-pressed Government official might well give to stellar observations, under the tuition of old native navigators. My chart of the heavens was made at home (*fonte de mieux*) with the aid of a pair of compasses, a nautical almanac, and no experience whatever. Except, therefore, when I was dealing with such easily located constellations and stars as the Pleiades, Sirius, Rigel, Antares, the Cross, and the like, it is more than probable that my identifications were wrong. My reckoning of the right ascensions of the various stars identified on the spot has been made with the aid of *Lloyd's Nautical Almanac* for 1917, p. 35 ("Mean Places for 100 Principal Stars").

good weather. The spider was another prophet : when the weather was set fair he would stay all day in the middle of his web : but if wind and rain threatened, he would retire to something more solid. The moon was closely observed : if it had a halo in which more than ten stars could be counted, there would perhaps be rain, but not a great downpour : if fewer than ten stars were visible, there would be much rain and probably wind. If, again, the moon had a double halo, the inner one reddish-brown in colour, it promised a torrent on the wings of a gale of wind. But the most reliable barometer in the opinion of a native navigator was (and still is) the shellfish *nimatānin* (*Nerita plicata*). This is found in the shallows on the reef by the ocean beach of the islands. When fair weather promises, it remains on the surface of the rock, and if it is found thus in any great numbers there is every hope of a long, fine spell : but if the creature remains in the crevices of the reef, it is an infallible sign of rain and heavy seas, and the deeper it hides itself the worse will be conditions for sailing.

Before setting sail in the fair-weather season, a Gilbertese mariner will sometimes spend several days in looking at the sea. If it is streaked in places with calm patches of an oily appearance he will refuse to start until these disappear, for they speak to him of strong currents.

Having set out on his voyage, and dropped the land, the navigator will keep his eye on the birds. If he lose sight of these, he knows that no land is near. But if, after a long voyage, he meet a flock of gulls,¹ which mount high in the air and cast about to different points of the compass, he will steer in the direction they ultimately take, for that way lies terra firma. Another sign of land for which he watches is its "loom" upon the horizon. This I have many times seen myself ; it is quite unmistakable. The white sand and still lagoon of an atoll reflect the tropical sun-glare upwards, so that a pale, shimmering column is shot into the air over the island, whose presence is thus betrayed at great distances. The clouds also have a tale to tell. When a mass of cumulus towers over an island, some draught, caused probably by the refraction of heat, bends over the pinnacles of the cloud, so that it dips towards earth. Twice, while at sea, this phenomenon has been pointed out to me by a native, and in both cases it proved a true compass.

When visited by a squall of rain between lands, or when travelling by night, with only a sense of direction to guide him, the sailor observes the waves. If these suddenly change in direction he knows that land is near : especially sure is he, when he passes from a beam-sea into a swell that lifts first the stem and then the stern of his craft.

When utterly gone astray at sea, having tried all other expedients in vain, the native naturally resorts to that everlasting prop of his race—magic : that is his last, and probably his staunchest, stand-by. I give here a charm which is actually alleged

¹ Particularly of a species of sea-bird called *Maningoningo*, which I have not been able to identify.

to have saved a life ! The old man who dictated it to me was lost on the high seas somewhere between the islands of Beru and Onotoa. Caught in a squall from the north-east, he had survived six hours of battering, but emerged without a sail, and with no paddle, from the unequal struggle. He drifted for four days : he tried all manner of magic, but nothing availed him. Then of a sudden he remembered that he was a baptised Christian. So, very subtly, he conceived the plan of Christianising his pagan invocations, by introducing the names of the Father and the Son. So persuasive was this revision, that land immediately appeared above the horizon. Here is the very singular hybrid charm which he used :—

<i>Tabeka-n nima-ia Matairua Mataironga :</i>	The lifting of the draught ¹ of Matairua, Mataironga ² :
<i>I matabae, I matabao !</i>	I am cross-eyed, I am cross-eyed !
<i>E, I aki atava meang, I aki atava maiaki,</i>	E ! I do not know north, I do not
<i>I aki atava Karawa ma mōne—O ba !</i>	know south, I do not know heaven or the underworld—O ba !
<i>Tabetabeki-ko nima-u ni borau</i>	Lift thyself up my draught of voyaging.
<i>Ke a tuatuaug-ai ma-n angungan-ai :</i>	Let them tell me and direct me ; I am
<i>I matabae, I matabao !</i>	cross-eyed, I am cross-eyed !
<i>O bu, ba ! Te Atua ma Ietu, ti pkoe te</i>	O bu, ba ! God and Jesus, only thou
<i>aba, te Atua, nkoe marawa.</i>	art the land, God, thou the ocean.
<i>E tei ba te angibuaka, imitia, oreia,</i>	The evil wind blows, destroy it, smite it,
<i>Kararanakoa aba-na.</i>	disperse it to its land.
<i>Marawa ! E-e-e-o.</i>	The Ocean ! E-e-e-o.

Many were the dangers of the deep, besides the threat of bad weather, feared in the old far-voyaging days by the Gilbertese mariner. Wind and sea, indeed, he seems to have feared not at all in any mood, for they were measured adversaries which he might combat with a definite technique. Against these he employed magic only when skill of hand and strength of hull seemed to have failed him. But against the hidden enemies who lurked beneath the waves and behind the curtains of the horizon—the fierce fish, the hidden shoal, and the waterspout—he fared forth provided with a whole collection of charms and magical impedimenta.

Every voyaging canoe was first furnished with an entire shrivelled coconut leaf, the very presence of which aboard was thought to discourage the attacks of porpoise, shark and sword-fish. But these dangerous creatures might be incited to exceptional fury by the evil magic of enemies, in which case they would surmount the charmed rampart of the coconut leaf, and so it was necessary to be prepared with a second line of defence. The whole system of magic by which the mariner protected himself from the attacks of these fish and from destruction by rock or waterspout was called

¹ A draught of sea-water.

² Names of spirits.

collectively *Te Tiri-kua*—*The vanquishing (of the) porpoise*. It was divided under the following heads :—

I. *Te Kainonoki*.—This was the variety of charms used against porpoise or shark which attacked the canoe from *the outrigger side*. During the incantation a wand of ringstraked *uri* (*fragrant*) wood was held like a fishing-rod in the direction of danger. Here is one of the charms belonging to this category :—

<i>Ko titiroa, Ko maatie, Ten Na-Kua mai</i> <i>abam. Kabi-ni marawa.</i>	Thou art-pleased, thou comest-in-sport Sir Porpoise, from thy-land the-keel- of-the-sea.
--	--

Baa ! I angun-iko bai-m.

Baa ! I give-thee thy-possession.

Baa ! Mimitongi ni Karawa. Toui ma
Namakauna !

Baa ! Glories of heaven, Sun and Moon !

Ko titiroa, Ko maatie-e-e-e !

Thou art-pleased, thou comest, in sport—
e-e-e !

Note with what extreme politeness the enemy creature is persuaded to leave his prey. This respectful attitude of the Gilbertese towards the porpoise is a characteristic of the race, and comparable to the Samoan deference towards the bonito.

II. *Taboingana*.—This is the generic name of charms warding off shark or porpoise from *the bows* of the ship, while the magic which protected against attack from *the stern* was called *Te Ika-auriaria*.

During recitation of the above, a green unhusked coconut was held in the hands, about breast-high, towards the threatening fish.

III. *Te Raku* (swordfish).—The perilous creature has given its name to the magic which was used to defeat it. While the specific charm was being muttered, a branch of tiny, newly-formed coconuts was carried from end to end of the canoe, the young nuts being scattered over the craft.

IV. *Te Wari*.—This peril of the high seas was only met in very distant waters ; it was described to me by an old navigator as “ a thing which came up under the keel of the canoe and pulled it down, as it were a whirlpool.” I conceive this to be a memory of volcanic waters.

When the incantation against *Te Wari* was being recited it was necessary to anoint with coconut oil the clew of the sail between the sprit and the boom.

V. *Nai Nakunrae*.—Protective magic against hidden reefs or shoals. If the mariner suddenly found himself sailing amid such dangers he spoke his particular charm and flung handfuls of white sand into the water by the bows. Last of all, he threw into the sea a small handful of red coral chips, which were supposed to open a clear passage before his vessel.

VI. *Ruberubei-te-nang* (Tremble-the-cloud).—The waterspout. When this terror of the deep approached such a charm as the following was recited, while a very young coconut leaf, not yet fully opened, was waved in the direction of danger :—

<i>Ruberubei-te-nang, nkoe !</i>	Tremble-the-cloud, thou !
<i>Me na baka, me na matoto i matuki-ni</i>	So-it shall fall, so-it shall be-broken to
<i>wa-n ni boboran ikai !</i>	south of my-canoe of voyaging here !
<i>Ruberubei-te-nang, nkoe !</i>	Tremble-the-cloud, thou !
<i>Me na baka, me na matoto i meangi-ni</i>	So-it shall fall, so-it shall be-broken to
<i>nan ikai !</i>	north of my-canoe here !
<i>O, Ruberubei-te-nang, nkoe !</i>	O, Tremble-the-cloud, thou !

* * * * *

The love of his canoe still amounts to a passion with the Gilbertese native. It ranks second only to the feeling he has for his paternal lands. How highly a canoe was prized in the old days may be estimated by the single fact that it might sometimes be accepted as a forfeit in full settlement of a blood-feud. On the island of Abaiang there is an historic case on record, in which the timely gift of one of these craft prevented a sanguinary war : and, again, on that atoll, it was a practice of the chieftains to give liberty and land to slaves who were expert in building and handling their racing craft. For the shipwright's and the yachtsman's arts were gifts of the gods, entitling a man to freedom and a competence.

No doubt a great deal of this prestige that the canoe enjoyed emanated from its vital usefulness to people who wrung a good half of their living from the sea. But there was more in it than that. The canoe-emotion was, psychologically speaking, a complex whose components were not all utilitarian. The Gilbertese bosom fostered, and still fosters, a genuine love of canoes for their own sake—for their slim strength, their sweetness in handling, their lean and raking lines, and for the superb sport they afford a man. I have seen an old native sit for hours beside his own craft—not a particularly fine one, but his own—watching it with the eyes of a lover, and drinking in every point of beauty that it showed. With exactly the same expression in his eyes, I have seen an Englishman gazing at his newly-acquired car. This love of swift things, that have moods, that require deft handling, that seem to know a master-touch, is one of the most widely-shared emotions of the human race.

Notice the loving care with which a Gilbertese canoe-man chooses a name for his craft : were it a son he could not show more solicitude. He walks alone on the beach, he abstains from women, he eats neither fish nor any cooked food while his mind is bent upon the christening. No fear of an unlucky naming, no dread of unpropitious magic, impels him to such care and abnegation : he is simply governed by the desire of the *mot juste*, the well-found epithet, the name which will cap and consummate the work of his hand. And he generally finds it. The canoe-names of

the islanders abound in aptness, in grace, and in real poetic feeling: they have the authentic ring. "Movement-of-clouds," "Tongue-of-lightning," "Wing-of-dragon-fly," "Dawn-red," "Frigate-bird," "Light," "Seen-and-gone-again," "Child-of-the-Tide-race"—these are some few remembered at random: they are more than beautiful to us, for they are psychologically interesting, in that they show a deliberate æsthetic sense in the native, who consciously attempts to express the airy grace of his craft in epigrammatic fashion.

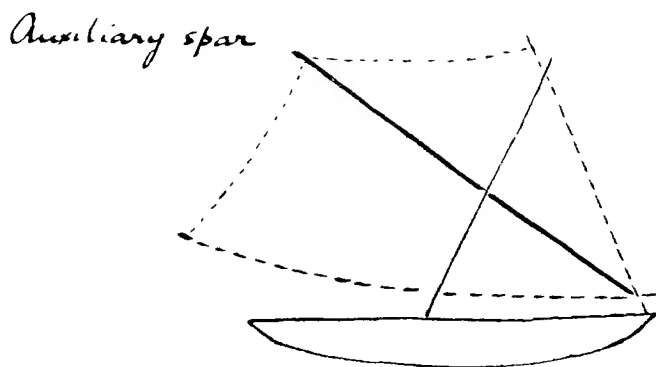
No sooner was a canoe built in the old days than its owner sent out challenges to race. Or, if no one would take up his gage, he fared forth in his craft to sail back and forth in the offing of some village, there to yell insults at the clustering houses until some knight, for very shame, should come out to give him battle. Often the villages were but waiting for this: purposely they suffered the challenger to hurl his contumely at their beaches for many days together, so that his defeat might in the end seem the more crushing. Unanswered he would be allowed to pursue his boastful course, until several craft were ready to meet him. Then, out they would all sail together to cram his insults down his brazen throat. No course was set, no signal given for a start. They simply manœuvred into line abreast and then hauled in their sheets: so, off they scudded with hoots and howlings, and stayed not until one was so far ahead that he was obviously the winner. But one race never decided the issue. Back they sailed to land, and there the beaten owners would readjust their hulls, shave down their spars, and alter their sails for a second trial. They might also use a right of "accusing" the canoe of the winner; that is to say, they might approach his craft with others of their family and accuse him of plagiarising a trick of construction that belonged to them alone. Such a charge, if proved, would at once disqualify him from further racing unless he consented to remove the offending part from his hull, for by common consent each clan must stand or fall by its own peculiar inventions, and none other. So, in the struggle for existence, did society as a whole endeavour to clear the ground for free competition between individual clans, and so, incidentally, by discouraging the free interchange of ideas, did it conspire to retard all communal progress.

Sometimes these informal regattas which I am describing lasted for many days at a stretch before it was definitely concluded that any particular canoe was a winner. Then, if it happened that the challenger was victorious, he would proceed to some other village and repeat his mannerless tactics, until he had either beaten every comer in that island or found someone to give him a salutary drubbing.

I am afraid these Gilbertese canoemen, splendid yachtsmen though they were, were not altogether sports-men in our sense of the word. They found it hard to take a beating. To avoid the imputation of a definite defeat they would often, in the course of an obviously hopeless race, cunningly smash some essential part of their craft—stay, a brace or a spar—and then pull out of the running with a tale of how they were just on the point of overhauling their man, when snap went the stay,

or bang went the boom, or pop went the punting-pole, or other such purple perjury. Nobody ever believed them, and they knew it, but in some strange way the father and mother of lies ministered to their souls' comfort, and they were able to regard themselves and their craft as victims of truly hard luck.

Sometimes a chief would hold a more or less formal regatta, in which case there would be less chance of evading outright defeat, for he would give judgment on the races and designate the winners. In fact, these regattas were much more ceremonious affairs. There was indeed no starting point, and no winning base, but certain rules had to be observed. Canoes were often classed for racing, according to length. But much more usually, length of hull was disregarded and height of sail taken as a standard. Word would be sent out that on a certain day all canoes having a sprit



so many fathoms long might race for mastery with the craft of such-and-such a chief. No other restrictions were imposed: it lay then with the ingenuity of competitors to lengthen their booms, or to devise new methods of getting a greater sail area, while all alike had the same length of sprit. Very often the device was to add an auxiliary spar, as shown in the accompanying sketch, which really amounted to a sprit properly so-called, and by which the leach of the sail was indefinitely heightened.

V.—NOTES ON ASTRONOMY.

The Gilbertese had an ingenious method of teaching astronomy at home. A youth to be instructed in star-lore was made to sit at the lease of the central pillar of any large dwelling, so that he faced the eastern slope of the roof.¹ The eaves of this represented the eastern horizon: the upward slope of thatch, the eastern sky: the ridge-pole, the zenith: the westward fall of the roof behind him, the western sky. The summit of the central pillar, by which he sat, represented the star Rigel, which is called *Taobaki-ni-Kamara*—*Ridge-pole-of-heaven*. From that middle point began his instruction. Just as the roof was divided by the lines of the rafters, so the heavens

¹ The slopes of the roof of every Gilbertese house were east and west, the gables being north and south.

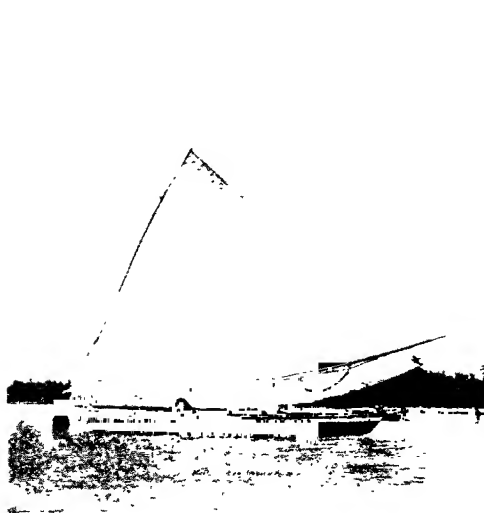
were plotted out for him in lines of principal stars : every constellation of the Gilbertese chart was allotted its imaginary place in the thatch, according to what we should call its angular distance from Rigel, and its declination north or south of that star. Line by line he learned them : first the *Rina-n nuka* (middle line), with its *leader*, Rigel : then a line to north of the middle, led by the Pleiades : after that, a southern line beginning with Antares : and so on. Before the pupil was allowed to identify a single star in heaven, he had to be word-perfect in this preliminary, theoretical groundwork, and in addition, he had to know by heart long lists of stars by which courses might be steered to the various lands included in his instructor's geography. Then only was he taken to the eastern beach and introduced to the open heavens.

One of the methods of memorising the guiding stars on any specific course was to weave a tale about them, wherein they figured as persons or objects seen during the voyage of some fictitious character. Very often, the better-known folk-stories of the race were adapted to this purpose. Some popular hero of myth is said to have set out on a journey to a particular place : first he came across an old woman sitting at the door of her house (Pleiades), on whom he played some familiar trick, which caused her to run away westward (*i.e.* decline towards her sitting). Next, he met a man coming in a canoe from the east (this is to say, he then steered by the star Aldebaran in the constellation of Taurus, which is V-shaped, like the section of a canoe). With him he held converse until the old woman, who had run away from him, fell into the sea (the Pleiades set) : she made such a dreadful noise that the hero of the tale ran away to eastward and took refuge with two old lepers (Gemini). And so on, until the tale has unfolded the whole series of stars by which a canoe is guided to some particular land. But these stories are exceedingly difficult to solve, for the star-lore of each family was one of the most secretly kept of all possessions, and the various disguises, under which the constellations were portrayed, differed with the fancy of the instructor. It is only by chance nowadays that one finds a key to such tales. Within half a generation all traces of the rich astronomy of the race will be gone for ever : the day of long-voyaging is gone : the old men, whose memories of travel are even now rusty, will be dead, leaving a younger generation which cares nothing for these things.

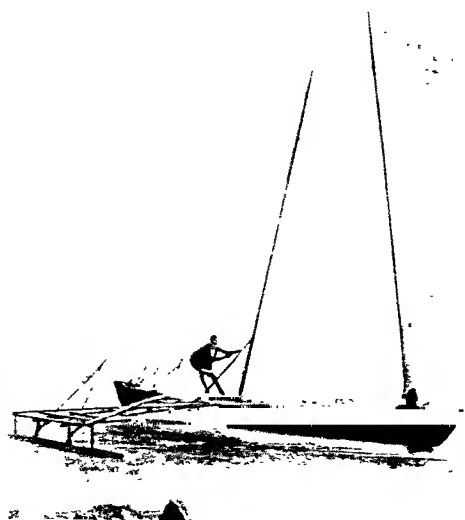
The following is a list of star-names, collected from the islands of Tarawa and Beru, against which I have set a few equivalents. Of these I am reasonably sure, but nevertheless except in the cases of the more brilliant stars, I should not care to dogmatise on my interpretations.



1. GILBERTESE "BAURUA" OR DEEP-WATER CANOE. A LAST SURVIVOR ON ABEMAMA ISLAND.
(BY COURTESY OF MRS. F. C. ELIOT.)



2. RACING CANOES LINED UP FOR A START.



3. CANOE OF TARAWA WITH COMPOSITE
FLOAT-ATTACHMENT.

Gilbertese name.	Equivalent.	Notes.
1. <i>Nei Anti</i> ...	Pleiades.	
2. <i>Matiriki</i> ...	Rigel (β Orionis) ...	.. Called familiarly <i>Tuabake-ne-Karawa</i> , Ridgepole-of-heaven.
3. <i>Te Boto-n-aiini</i> ...	Aldebaran (α Tauri)	Lit. trans. of native name: The base-of-canoe-rib, with reference to its place in the V-shaped constellation of Taurus.
4. <i>Baba-ni-man</i> ...	Sirius (α Canis Maj.)	
5. <i>Kamei-n-naka</i> ...	Betelgeuse (α Orionis).	
6. <i>Taini-Karou</i> ...	δ, ϵ, ζ Orionis ...	.. Lit. trans. The Fishermen. These are the three stars in the Belt.
7. <i>Te-itua-n-inai</i> ...	The three tiny stars in a line from N. to S. at the base (E. end) of the Belt.	Lit. trans. The weaving of the screen.
8. <i>Te tit-nota-te-iaui</i> ...	Small star between ζ Orionis and the above.	Lit. trans. The corner of the screen.
9. <i>Na-Kabane'i</i> ...	$\left\{ \begin{array}{l} \text{Procyon (}\alpha \text{ Canis Min.)} \\ \text{ } \beta \text{ Canis Minoris} \end{array} \right.$	
10. <i>Bai-Kare</i> ...	α Hydrae.	
11. <i>Mataraa</i> ...	Spica (α Virginis).	
12. <i>Antimamawa</i> ...	Gemini (Castor and Pollux)	
13. <i>Kauma</i> ...	Southern Cross ...	... <i>Kauma-iti</i> and <i>Kauma-rabi</i> (<i>Kauma-flask</i> and <i>Kauma-twinkle</i>) are two components.
14. <i>Tokia and Rehou</i> ...	Pointers to Cross.	
15. <i>Baimon</i> ...	Venus (Morning star).	
16. <i>Te itoi-tariti-ki</i> ...	Venus (Evening star) ...	Also called <i>Te itoi-ne-nguina</i> , the star of daylight.
17. <i>Ka-meang</i> ...	Capella (α Aurigae)	... Lit. trans. Make-north.
18. <i>Ka-miaki</i> ...	Canopus (α Argus)	... Lit. trans. Make-south.
19. <i>Te O-mi-Kituba</i> ...	Corona Borealis ...	... Lit. trans. The enclosure-of-sand-pipers.
20. <i>Nei Anti-te-maububu</i> ...	Several stars in the constellation of Cancer.	Lit. trans. <i>Nei Anti-the-misty</i> (see No. 1).
21. <i>Rimwimaata</i> ...	Antares (α Scorpius).	
22. <i>Nomouba</i> ...	β Argus.	
23. <i>Te Baraitoa</i> ...	Corona Australis	.. A <i>Baraitoa</i> is a certain sort of hat.
24. <i>Te Anoi</i> ...	—	Lit. trans. The hammer-headed shark.
25. <i>Te bai-burebure</i> ...	—	
26. <i>Te bai-buobuoki</i> ...	—	
27. <i>Te bwe-bwe</i> ...	—	Lit. trans. The twin, or else, the twig.
28. <i>Bai-n-Rimwimaata</i> ...	—	Lit. trans. The crown of Rimwimaata, (see No. 21).
29. <i>Bai-binguo</i> ...	—	Lit. trans. Thing-filthy.
30. <i>Boboran</i> ...	—	A star marking the northern solstice.
31. <i>Te engea</i> ...	—	The <i>engea</i> is a tree: <i>Pemphis aculeata</i> .
32. <i>Kakaranga</i> ...	—	
33. <i>Kāu</i> ...	—	Lit. trans. Porpoises.
34. <i>Te Kumele</i> ...	—	<i>Kumele</i> is a wooden bowl.
35. <i>Kaburaa</i> ...	—	
36. <i>Kabarekerekere</i> ...	—	
37. <i>Te Kai-m-moi</i> ...	—	<i>Kai-mi-moi</i> is a ladle of coconut shell.
38. <i>Kameio</i> ...	—	
39. <i>Kame-rariki</i> ...	—	
40. <i>Te Kabaru</i> ...	—	Lit. trans. The rat-trap.
41. <i>Te muiori</i> ...	—	Lit. trans. The crab.
42. <i>Matimaba</i> ...	—	Probably another name for Capella (see No. 17).

Gilbertese name.	Equivalent.	Notes.
43. <i>Moutakateka</i>	—	
44. <i>Tē mōtōtongu</i>	—	
45. <i>Tē mōtōtōngū-ni-mutung</i>	—	
46. <i>Maukutra</i>	—	
47. <i>Tē mau-n-ate</i>	—	
48. <i>Nakateri</i>	—	
49. <i>Natua-ni-bure</i>	—	
50. <i>Nakabibi</i>	—	
51. <i>Tēu Natiani</i>	—	
52. <i>Nautere</i>	—	
53. <i>Nouburebure</i>	—	<i>Nouburebure</i> is the name of a mythical personage, who seems to be the patron of the catsradle.
54. <i>Nakumotu</i>	—	
55. <i>Tauuauuauu</i>	—	
56. <i>Torobabua</i>	—	Lit. trans. Squat in a row.
57. <i>Toriba</i>	—	
58. <i>Tē tabio</i>	—	<i>Tabio</i> is the steering purchase of a canoe fore and aft.
59. <i>Ūu</i>	—	<i>Ūu</i> means angry.
60. <i>Tē wa</i>	—	Lit. trans. The canoe.
61. <i>Natabu</i>	The Milky Way.	
62. <i>Namakaiana</i>	The Moon.	
63. <i>Taui</i>	The Sun.	

PHASES OF THE MOON.

1st Day	...	...	<i>Ba-a-uri</i> (= leaf-of- <i>fragraea</i> tree).
2nd Day	...	...	<i>Bati-u-ika</i> (= movement-of-fish).
3rd Day	...	...	<i>Koran</i> (= fibre of coconut-husk).
4th-10th Day	...	...	<i>Aomuta</i> (= human, in its right mind).
11th-23rd Day.	...	...	<i>Kareuo</i> (probably = <i>ika</i> , fish, and <i>uoi</i> , good).
24th Day	...	...	<i>Neueroro</i> (<i>Neue</i> = tongue; <i>roro</i> = dark).
25th-30th Day	...	...	<i>Kati</i> (= all gone—meaning that there are no fish to be caught during these days).

VI.—GILBERTESE NAMES FOR PARTS OF A CANOE.

While *Baurua* is the name given to the large, ocean-going vessels of the Gilbertese, the generic name for canoe is *wa*, a word which appears over the whole Oceanic area in various forms: *cp.* Marquesan, Tahitian, Tongan, Tokelau, *vaka*; Fijian, *waka*; Maori, *waka*; Samoan, *va'a*; Tanna, *toti*; Indonesian, *wau*, *waga*, *way*, and so forth.

But although *wa* is the only word consciously used by the Gilbertese to signify canoe, they have preserved another form, namely, *aka* in the compound *Bare-aka*, a canoe-shed, and in a great many names of legendary canoes, such as "Aka-aka," "Aka-bu-toatoa" and "Aka-manono-aba."¹ We seem to see *aka* once more in the

¹ These were three of the famous vessels said to have brought the ancestors of the race from Samoa to the Gilbert Islands. *Aka-bu-toatoa* = Canoe-breed-heroes; *Aka-manono-aba* = Canoe-Manono-island. Manono is the small island in the ocean gut between Upolu and Savaii.

word *uka-wa* (*to go fishing*), where it is curiously linked together with the more usual form *wa*.

In *uungu* (*to use a float while swimming*) we appear to have yet a third variant preserved, though it has departed somewhat from its original sense.

The side of a Gilbertese canoe from keel to gunwale line is theoretically divided into four equal parts. The lowest is called the *bauka*. This word is applied to the garboard strake, but not confined to it, for it also designates one full quarter of the canoe's depth amid-hips. The division above the *bauka* is named *maupet*; over that is the *bua*; and highest of all is the *wi*. It is difficult to be more precise in describing these divisions of the vessel's side, for they do not in any way govern the laying of the planks in the hull, being merely, as it would seem, academic apportionments. For the first two I can find no obvious meaning, but, of the last two, *bua* signifies *throat* and *wi*, *mouth*. I think that in past days these names had some reference to the curvature of the canoe's cheeks between keel and gunwale, but later lost their significance on account of some modification in the shape of the hull which took place locally.

The list of canoe-parts and sailing-terms which follows has, unfortunately, to be made from memory, as the accident mentioned in an earlier note lost me not only my measurements of the Abemama *Bauma*, but also a very complete collection of nautical idioms.

About-ship	...	...	...	...	...	<i>Ricki</i> .
Adrift	...	...	...	...	...	<i>Tabe t</i> .
Aft	...	...	...	...	...	<i>I-baki</i> .
Aground	...	...	...	...	...	<i>Koro</i> .
Anchor	...	...	...	...	...	<i>Ro, ahi-n-rovati</i> (rock).
.. to	...	...	...	...	...	<i>Ro</i> .
Bail	...	...	...	...	...	<i>Kadi-iti</i> .
Bay	...	...	...	...	...	<i>Ma, oka-n-ghat</i> (= elbow-of-land).
Board	...	...	...	...	...	<i>Rai, Kai-ra-bat</i> (= wood-board).
Boom (of sail)	...	...	...	...	...	<i>Imatino</i> (<i>i-nang</i> = below).
Brace (of mast)	...	...	...	...	...	<i>Tura</i> .
.. (of outrigger)	...	...	...	...	...	<i>Bai</i> .
.. (of hull)	...	...	...	...	...	<i>Kai-n-wo</i> (= wood-of-over-side).
Breeze	...	...	...	...	...	<i>Ang</i> .
.. baffling	...	...	...	...	...	<i>Taw-babi, ang-i-a, ang-i-m-wo, ang-kaan</i> .
.. light	...	...	...	...	...	<i>Teme-n-ang</i> (= white-of-wind), <i>ang-i-m-wo</i> .
Building (a canoe), the act of	...	...	...	...	...	<i>Bobot</i> .
Calm, dead	...	...	...	...	...	<i>Aarik</i> .
Canoe	...	...	...	...	...	<i>Wa</i> .
.. sides of: leeward	...	...	...	...	...	<i>Katea</i> .
.. .. windward	...	...	...	...	...	<i>Ravna</i> .
Capsize	...	...	...	...	...	<i>Bava</i> .
Capsized	...	...	...	...	...	<i>Bava, bava-ki</i> (<i>ki</i> is passive suffix).
Carvel-joint	...	...	...	...	...	<i>I-wo</i> .
Caulk, Caulking	...	...	...	...	...	<i>An</i> .
Clew of sail (at peak)	...	...	...	...	...	<i>tubera-ni-lou</i> .

Clew of sail (at throat) ... ..	...	...	...	...	...	W <i>i-n-iē</i> (= tooth-of-sail), <i>wi-ni-bati</i> .
.. (at end of boom) ... ..	...	...	...	...	...	<i>Buki-ni-banga</i> .
Clinker joint ... ..	...	...	...	...	...	<i>Karima</i> .
Current ... ..	...	...	...	...	...	<i>Aira</i> .
Dashboard (at stems) ... ..	...	...	...	...	...	<i>Karetaba</i> .
.. (at sides) ... ..	...	...	...	...	...	<i>takua</i> .
Die (of wind) ... ..	...	...	...	...	...	<i>Maneirika</i> , <i>Kaaki-bai</i> (= cast off wings).
Down by stem ... ..	...	...	...	...	...	<i>Taomoa</i> (<i>tao</i> = press; <i>moa</i> = forward part).
.. by stern ... ..	...	...	...	...	...	<i>Taobuki</i> (<i>tao</i> = press; <i>buki</i> = after part).
.. wind ... ..	...	...	...	...	...	<i>I-uan</i> (= under).
Ease away ... ..	...	...	...	...	...	<i>Kaaki</i> , <i>Kaaukua</i> .
Edge of plank ... ..	...	...	...	...	...	<i>Inuo</i> .
Float of outrigger ... ..	...	...	...	...	...	<i>Rama</i> .
.. attachment of to outrigger ... ..	...	...	...	...	...	<i>Toto</i> .
.. to ... ..	...	...	...	...	...	<i>Eba</i> , <i>beti</i> , <i>beibeti</i> .
Forward (of any craft) ... ..	...	...	...	...	...	<i>I-moa</i> .
Gaff or sprit ... ..	...	...	...	...	...	<i>Inaieta</i> (<i>i-eta</i> = above).
Gunwale ... ..	...	...	...	...	...	<i>Kai-n-as</i> .
Halyard ... ..	...	...	...	...	...	<i>Irake</i> .
Haul in ... ..	...	...	...	...	...	<i>Katika</i> .
Haul up (as the sail) ... ..	...	...	...	...	...	<i>Iraken</i> .
Hole bored for lashing ... ..	...	...	...	...	...	<i>Mata</i> (= eye).
Keel ... ..	...	...	...	...	...	<i>Kabi</i> .
Lashing of hull ... ..	...	...	...	...	...	<i>Kibā</i> .
Luff ... ..	...	...	...	...	...	<i>Tewea-rake</i> (= throw up).
Mast ... ..	...	...	...	...	...	<i>Aneang</i> .
Navigator ... ..	...	...	...	...	...	<i>Tonga-biri</i> , <i>tonga-biti</i> .
Ocean ... ..	...	...	...	...	...	<i>Marawa</i> .
Outrigger ... ..	...	...	...	...	...	<i>Kiuro</i> .
.. transverse battens on ... ..	...	...	...	...	...	<i>Nauumuan</i> .
.. endmost transverse batten ... ..	...	...	...	...	...	<i>Kai-ni-marawa</i> (= wood-of-ocean).
.. outer brace of, to hull ... ..	...	...	...	...	...	<i>Bai-n-tinaniku</i> (= brace-of-outside).
.. inner brace of, to hull ... ..	...	...	...	...	...	<i>Bai-n-narwa</i> (= brace-of-inside).
.. platform of ... ..	...	...	...	...	...	<i>Barebama</i> .
Paddle ... ..	...	...	...	...	...	<i>Bwe-n-ari</i> .
Punt, to ... ..	...	...	...	...	...	<i>Aonua</i> .
Punting-pole ... ..	...	...	...	...	...	<i>Kai-n-uaoa</i> .
Race, to (in canoes) ... ..	...	...	...	...	...	<i>U'au-ua</i> .
Readjust, to (a part of a canoe) ... ..	...	...	...	...	...	<i>Ringa</i> (= touch).
Repair, to (a canoe) ... ..	...	...	...	...	...	<i>Kaba</i> , <i>Karikauka</i> .
Rib (of canoe) ... ..	...	...	...	...	...	<i>Aiai</i> .
Sail, a ... ..	...	...	...	...	...	<i>Iē</i> .
.. leach of ... ..	...	...	...	...	...	<i>Take</i> .
.. peak of ... ..	...	...	...	...	...	<i>Wi-n-take</i> .
.. sheet of ... ..	...	...	...	...	...	<i>Babu</i> .
Sail, to ... ..	...	...	...	...	...	<i>Iēē</i> .
.. fast ... ..	...	...	...	...	...	<i>Kai-buti</i> , <i>bu-buti</i> , <i>bakawere</i> , <i>Kauuei</i> .
.. up wind ... ..	...	...	...	...	...	<i>Ara-rakē</i> (<i>rake</i> = up).
.. on a beam wind ... ..	...	...	...	...	...	<i>Riru marewe-n te ang</i> (= to-wear-as-a-garment the-crest-of the wind).
Sea (in lagoon) ... ..	...	...	...	...	...	<i>Tauri</i> .
.. (outside lagoon) ... ..	...	...	...	...	...	<i>Marawa</i> .

Sea choppy, a	<i>Nao-moro, nao-butia.</i>
„ cross, a	<i>Nao-bangaki.</i>
„ confused, a	<i>Nao-ni-Kabano, nao-bai-ni-kiu-kia.</i>
Star	<i>Ito (Itoina = navigate by stars).</i>
Stay, from masthead to outrigger	<i>Ata.</i>
„ „ stems	<i>Tamori, Kabangitang.</i>
„ from peak to outrigger	<i>Tikotiko.</i>
Steer, to	<i>Tau-bwe (= hold-oar), intrans. Buena, trans.</i>
Steering-oar	<i>Bue.</i>
„ purchase for	<i>Tahio.</i>
Step of mast	<i>Takataka.</i>
„ of sail	<i>?</i>
Swell	<i>Nagoon.</i>
Thwart	<i>Karo-moti (= outrigger—shortened).</i>
Tide	<i>Ia.</i>
spring	<i>Mou-a-ia (maa is superlative).</i>
„ neap	<i>Ia-ra.</i>
„ low... ..	<i>Ora.</i>
„ high	<i>Ia-bati.</i>
„ flood	<i>Ia-rake.</i>
„ very high	<i>Ia-baba.</i>
Voyage, a	<i>Boran.</i>
„ to	<i>Boran, boboran.</i>
„ to prepare for a	<i>Ientaa.</i>
„ to set forth on a	<i>Raaa (= embark).</i>
Wake (of a vessel)	<i>Wepi.</i>
Wave	<i>Nao.</i>
Weather, fine	<i>Raoi.</i>
„ foul	<i>Bauki.</i>
Wind	<i>Ang.</i>

HYDERABAD CAIRN BURIALS AND THEIR SIGNIFICANCE.

[WITH PLATES XXII—XXVIII.]

By E. H. HUNT, M.A., M.Ch. (Oxon), F.R.C.S.

CIST-GRAVES, with stone circles, are common in South India, and are found in association with pillar stones, dolmens, etc.

They have been called cairns by many writers and the word will be used in this paper, though the height of the rubble stones inside the circle does not fully justify its use. The subject matter will mainly be confined to one particular type of burial, studied by the writer in the Hyderabad State.

An account will be given of the main structural features and of the methods which have been adopted in opening.

Under separate sections will be considered shortly—(a) Bones : (b) Pottery and Pot-marks : (c) Beads ; (d) Gold and silver : (e) Copper : (f) Iron.

History, legend and present-day customs will be discussed in connection with the burials and, finally, a short note will be added as to their significance.

SURFACE FEATURES.

The main surface-indication of the presence of cist-burials is a group of stone circles (Pls. XXII and XXIII). These vary in diameter from about 18 feet to 70 feet or more. Individual stones may weigh as much as five tons, but the average is far smaller. Granite and black stones from intrusive igneous dykes are used indiscriminately, according to the material available.

The site of a cairn field is invariably hard ground, which is not suitable for cultivation. Near by, however, is irrigation, and there can be little doubt that the people who made the cairns lived mainly, as do their present-day successors, by means of this form of cultivation.

Cairns are found singly, in twos and threes, and in groups which may number thousands. Taking Secunderabad as a typical area, within a radius of about five miles six large groups can be seen to-day, and many small. The inference is that each group was but a local burial ground.

The elaborate nature of the grave and the labour involved in constructing it lead to the further inference that important persons alone could have been honoured by this form of interment.

The conclusion can thus be reached that the people who made these cairns held full control of South India for a prolonged period. No figure can be given which even approximately estimates the number of these burials, but for the Hyderabad State alone it cannot be far short of a million. The number of centuries which cover what may be termed the "Cairn Period" must remain at present a matter for mere speculation. In any case, one must infer that considerable intervals of time separate the individual cairns of any one field, and, still more so, the different groups. Variations in the structural features of different types of cairns and in their contents call for co-ordinated study, and one may hope that when this study is taken in hand there may result the possibility of classifying cairns in accordance with their relative age.

A common "variant" type of cairn is to be seen in large numbers between the two Maula Ali hills near Secunderabad, at Begumpet, at Kompilly, and at Raigir. In these the space within the stone circle is nearly filled by a huge granite slab. Under this slab is the cist cavity, and into a cist of this nature at Kompilly, twenty men entered at one time. The mechanical difficulties which face anybody who tries to open up this type of cairn are serious, and so far no real study has been made.

Pillar stones form another important surface feature. In a very large group a mile from the Begumpet railway station four such pillars are found in two definite pairs, each pair being on the north and south line. In a group two miles east of the main Raigir group there is a large circle the most northerly stone of which is a pillar about 25 feet high. A sketch published by Miss Graham a century ago shows that other pillars of this nature exist, incorporated in circles. The fixing of these pillars in the north adds to the significance of the customary north and south position of the cists.

During the opening of ten cairns at Bowenpilly many interesting points were observed as to surface features. Nothing whatever was found inside some of the more clearly defined circles, and it was concluded that these might be merely cenotaphs. This observation has not been confirmed, so far, in other groups. The best results at Bowenpilly were obtained from cairns selected because there was an upstanding heap of rubble stone, this being a certain indication that the cist had not been rifled in the past, and a probable indication that the roof stones would be intact and the cist contents in good condition. To any who desire to open cairns, this point may be commended.

Denudation of ground surface can be observed well in many groups, particularly at Bowenpilly. In one part of the cairn field cists lie deeply buried, and are covered with a layer of rubble stones many feet thick. As one moves across the field the cists are found at a decreasing depth, and roof-stones appear on the surface. Proceeding further, side-stones appear and the deeper parts of cist cavities. Finally, floor-stones are on the present-day ground surface, and areas can be seen which presumably once held cairns of which all trace has now vanished.

Now, these cairn fields are situated on hard ground, consisting mainly of "mooram" soil, the result of decomposition of granitoid gneiss *in situ*. The land surface is the oldest in the world and has never been under the sea since the Vindhyan period. Rain falling directly on to this hard surface is the sole agent which can cause denudation, and we have here a clear indication of considerable age for the burials.

THE STRUCTURAL FEATURES OF A CAIRN AND THE METHODS USED IN OPENING.

A cairn having been selected, a clear label is painted on one of the stones of the circle. Thus "R. XIX" can be seen on a stone (Fig. 1. Pl. XXIV), the plate automatically recording the serial number of the cairn. The north and south line is next marked out and a measuring tape placed along this line.

It is convenient to fix this line once and for all by means of paint marks on the stones. Later, when the cist is exposed, the tape can be replaced along this line, and the camera will record the exact deviation of the long axis of the cist from the north and south line.

Excavation can now be commenced, pickaxes being used. As a rule nothing of special interest is found in the surface layers, and for a depth of many feet hard masses of rubble stones need to be removed. The rusted remains of iron axe-heads are sometimes found near the surface, quite close to the stones of the circle. After the rubble has been removed the underlying "mooram" soil is exposed, and the pickaxe continues in use. At a greater or less depth the head- and foot-stones of the cist are found projecting nearly vertically upwards. These are cleared and the roof of the cist exposed. One can now probe the interior of the cist through a hole made between two of the roof-stones. If a cavity is found the outlook is good. If, however, roof-stones have broken and have fallen bodily into the cist cavity, followed by a shower of rubble, it is wiser to abandon the cairn and start on another, for the contents of the cist will be ruined.

The real labour of excavation now begins, though for a time work is easy, for pickaxes can still safely be allowed.

For a wide space round the cist, "mooram" is gradually taken out, care being exercised that no objects are missed.

Finds are made in most unexpected places, but as a rule nothing turns up till a level is reached about half-way down the side-stones. The rim of a pot shows up, and if this was not broken originally it will be broken by the pickaxe which disclosed it. No tool may now be used except small wooden sticks or tent pegs, fine knives, and the like. Bit by bit the soil is broken up, loosened and removed, the pots appearing one by one.

Infinite patience is required and very close control of all who are working. When all is complete the camera records what has been found. The difficulties facing the photographer are considerable, but can be overcome. A long iron ladder

with angle-iron supports straddles the excavation. The camera is held at the top on a movable wooden extension piece, which allows of any position being used. Dawn provides ideal light conditions, illumination being diffused even in the deepest corners of the excavation. An actinometer infallibly dictates the exposure, while the use of lenses of different focal lengths gives one complete control of the area which is to be included in the record. For the finest work a stop of F 64 and a slow, fine-grained plate can be recommended. In this manner a series of photographs can be obtained showing in plan view every cist which has been exposed, with the pots surrounding it.

Pl. XXIV, Fig. 1, of Raigir XIX, shows a stage of excavation. The earth which has been removed is seen as a dark ring outside the circle of stones.

The top of the cist of Raigir XIX is seen to lie fairly near the surface, and the long axis is within 5 degrees of the north and south line. This is an average deviation, some cists lying within 1 degree of north, while, as an extreme exception, the cist of Raigir XXIV pointed north-east. Innumerable cairns have been opened in the past by villagers for the purpose of rifling the cists, and there is ample material for study lying exposed. It is clear that a north and south direction of the cist was an important item in the ritual of the cairn builder.

In the second photograph of Raigir XIX (Pl. XXIV, Fig. 2) the ladder camera-stand has been moved up over the excavation so that the lens is nearly above the centre of the cist, and the camera is pointing downwards. The cist is seen to be surrounded by pots, and the arrangement of these pots may be taken as typical. Note a group of small pots to the north, near the foot-rule, with no corresponding group to the south. Such groups are often seen, and in many cases are so far away from the centre of the cairn that they lie under the stones of the circle, and under-cutting is required to expose them.

On the whole, the pots are in good condition, and many are still intact. It is for this reason that the Raigir field has been chosen for exploration, for one cairn at Raigir will produce more material for study outside the cist than will ten or twenty at Maula Ali, Bowenpilly, or Dornakal.

The pots can now be removed, and it is advisable to label each to show the position it occupied. Pots can then at any time be compared with the original photographic record, and as an example of the utility of this, one may refer to the line drawing of the pot-marks of Raigir XXIII. (Text-fig. 1, p. 151.)

As pots are taken out others will be found under them, and many unexpected treasures come to light. Broken ring-stands are common. These pots have been subjected to great pressure for a long period, and it is to be noted that if a lid has given way so that earth has freely entered a large pot, the pot itself may be intact. Conversely, if the pot has collapsed the lid may be intact. Some of the large pots were originally used as protective receptacles for small pots, so that it is always worth while to search inside the fragments of every pot, however broken it may

appear. Iron sickles, etc., are also found, placed inside pots. Iron axe-heads and knives, copper ornaments and bells, grindstones, etc., come to light, placed in the most unexpected positions.

THE CIST.

The cist of Raigir XIX is seen in plan view, but this gives a false impression. The photographs of Bowenpilly (Pl. XXV) show the construction of a cist to better advantage.

Deep in the ground, sometimes over 16 feet below the present-day surface, lies a floor-stone, with its long axis north and south. This stone is commonly about 7 feet long, 4 to 5 feet wide and 6 inches thick. On its ends rest the head- and foot-stones. These are about 8 feet high, or more, and converge towards each other at their tops. Along the edges of the floor-stone rest the big side-stones. These measure from 5 to 9 feet in height and from 7 to 11 feet in length, so that they project beyond the ends of the floor-stone to the north and south. They lean against the edges of the upright head- and foot-stones. Resting on the top edges of the side-stones are the roof-stones, these in their turn keeping apart the head- and foot-stones. The general construction of a cist is identical with that of a child's "house of cards."

These stones have been carefully shaped so as to make the box as earth-tight as possible. Note in Raigir XIX (Pl. XXIV, Fig. 2) two stones on the roof, over a junction of two roof-stones. Gaps were found under them, through which silt would have poured into the cavity.

A study of the exterior of a cist proves that the builders of the cairns intended to prevent stones and earth from entering the cavity. Meadows Taylor, in particular, misunderstood this point, with serious results.

The double convergence of the side- and head-stones causes the upper opening of the cist to be constricted, and the only satisfactory method of studying cist contents is to lay the box open. A trench is dug along the whole length of a side-stone to the bottom, and this entails work to at least 4 feet deeper than the pots. Pickaxes can again be used safely. During this work of digging the trench a row of stones will be found in every cairn at Raigir, at a level just below that of the pots.

These stones surround the cist and afford an interesting problem. It has been remarked above that either to the north or to the south of the cist, groups of pots are found so far from the centre of the cairn that they lie *under* the circle.

Taking the original depth of a cairn at 20 feet (Meadows Taylor found many much more than this), great difficulty would be found in placing the heavy cist-stones in position, unless there was a sloping entrance. Thus, in Raigir XIX the downward ramp would have been from the north, and in Raigir XVIII from the south.

Cairns such as Raigir II, V, and XXIV show by their skeletal remains that a fresh body had been buried, and the inference is that the cairn was ready for use

before the death took place ; for days or weeks would be needed before the work was completed.

Taking the above points together (the layer of stones round the cist, the pot-groups lying under the stone circle, the original depth of the cavity, and the evidence of burial of fresh bodies), one can put forward an explanation which at the worst forms a useful guide to anyone who opens these cairns. The workers dug a deep hole with an entrance sloping down either from the north or the south. Down this ramp they slid the cist stones and placed them in position, north and south. They then filled in the cavity to a depth of about 4 or 5 feet, to hold the cist-stones firmly, and faced the surface with a layer of stones.

The cairn was then ready for use at any moment, and in the direction of the ramp there would be more room for pots than at the opposite end. The last feature of the cairn to be completed would be the placing in position of the stones in the circle, and in many instances these would lie on top of such pots as had been placed in the lower part of the ramp.

THE OPENING OF A CIST.

Heavy roof-stones are dangerous to handle. A stone which may weigh over half a ton is supported on two long crowbars, and it is a simple matter to slide the stone sideways. The crowbars are lashed together, and when all is ready the workmen are told to come up out of the excavation. The rope is pulled, and the stone falls over on the side opposite the side-stone which is to be turned over. If no precautions are taken, grave injuries might result to the men, either through the stone itself or from crowbars being flipped in all directions. A few touches with a crowbar and the side-stone is now everted, disclosing the cist cavity. If the stones were a bad fit, the whole interior will be found filled with earth and stones. In most cases a space is left at the top, and the undisturbed work of the white ant is seen. In Bowenpilly VII and X and in Raigir XI the amount of silt which had worked its way inside was slight, and some of the cist contents projected into the air. In Bowenpilly VII a fine iron trident stood up in the north-east corner, bearing on its shaft an attachment which was clearly intended to represent the framework of a buffalo. Note the photographs of Bowenpilly I (Pl. XXV) and the manner in which the silt has come in at the corners of the cist. This silt is fine, and Meadows Taylor concluded that since it differed from any earth near by it must have been brought from a distance, to be specially placed inside the cists. Such faulty reasoning leads to serious defects.

There now comes the business of removing this earth, and in a cairn such as Raigir XXIV over 12 tons required to be handled.

The pick and shovel may be used freely until the lower depths are approached. When no more than a foot of silt is left, pots, etc., may be found at any moment, and it is well to revert to the small sticks. The silt is softer than the soil amidst

which the pots outside the cist are found, and progress is quick. It is well at this stage to confine the work to one end of the cist and to clear all silt right down to the floor-stone. If bony remains are found they should be left till later, but pots can be fully cleared. Photography is easy, for except at mid-day a sheet can be put up covering the opening and diffusing the light. The main photograph should show all the cist contents in their original position, and may be taken from ground level. The illustration (Pl. XXV, Fig. 5) of Bowenpilly I shows the silt in process of removal, the south-west corner in this case being cleared first.

Bones require special care, and a full knowledge of the human skeleton is essential if grave error is to be avoided. The common condition of such bony remnants as are present resembles ancient putty from a window frame, and little can be made out.

Great interest, however, attaches to fragments on certain occasions, and it may be possible to determine the age or sex of the person buried. The problem of human sacrifice is again only to be dealt with by those who know one bone from another.

It is a good rule to remove all pots temporarily before any attempt is made to examine the bones. Fine sticks can be used, and thin knives. A brush is also useful. Extended skeletons, as in Raigir II, V, and XXIV, can be cleared of silt without much difficulty, for all the bones lie in one plane on the floor-stone. Contracted skeletons are far more difficult to tackle, and huddled masses of bones of several persons are still more troublesome.

In Raigir II prolonged work was rewarded, for it could be proved that two left hip joints and a left elbow joint lay over two skulls. This mass lay to the west of an extended skeleton which was complete as regards neck vertebræ. A detached cervical vertebra was found elsewhere, and confirmed the curious position of individual bones in the huddled mass in suggesting that this mass represented two males who had been killed so that they might accompany the man, who had been buried lying on his back, with his dagger between his left wrist and his hip.

In Raigir XXI a single skeleton lay in the contracted position in the centre of the cist, head to the north. The skull showed female characteristics, and seven very small beads were found among the bones when these were subjected to close examination. A fine sieve assists in such a search.

Raigir XIII was a most interesting cairn, and the photograph (Pl. XXVI, Fig. 1) shows the floor of the cist. To the south is a pot, and near it is a large iron knife. In the centre of the cist is a heaped mass of bones from two large males. In the north-east corner is a collection of lapis lazuli beads, $6\frac{1}{2}$ ounces in weight. Behind lie a fine curry stone, an iron dish, and in the south-west corner a trident, handle up. The forks of the trident, and an attachment similar to that found in the open cavity of the cist in Bowenpilly VII, were buried in silt and had rusted almost out of recognition. Now this cairn and Raigir XIV formed a definite pair, with circles 33 feet in diameter,

and were selected for opening as they bore such a resemblance to two other cairns of the same size, both of which had yielded lapis lazuli beads, the "double circle" pot-mark, and the bones of a small child (? female). Raigir XIV yielded no beads, no double circle mark, and bones from two males occupied the cist, with no pots. The presence outside the cist of copper ornaments and grindstones, brought in, however, a domestic atmosphere, and it was by no means certain that the male bodies were not merely servants, slain as companions to someone of whom no trace was found. The cairn labelled R. XIII was opened next, and above the cist a fine copper bell was found, with two fillets which fitted the neck of a calf. Numerous pots bore the double circle mark, so far only found in association with lapis beads. The bell suggested a pet calf, and it was anticipated that lapis would be found in the cist, and the bones of a girl. The lapis beads were soon discovered, but the bones were those of two hulking males, huddled up. The iron dish and the curry-stone suggested cooking and the female sex, but the iron knife clearly appertained to the male sex. Later the pot was removed, and while the writer and a friend were attempting to disentangle the trident and its attachments, Mahomed Beg, our faithful foreman, cleaned the pot. He also had expected to find bones from a child, and from the ground surface, fully 15 feet above us, we heard him remark, "The bones of the little girl are in this pot." We were dealing with an urn burial.

The male skeletons now appeared in a different light, and seemed to be associated with the big knife. Had the knife been the weapon with which these servants had been slain so that they might accompany their young mistress to the Other World? Had the child died unexpectedly, when no suitable cairn was ready for her use? The small, disintegrated bones which lay in the pot suggested a secondary interment, but no sure answer will ever be forthcoming to our questions. There remains the strong probability that some definite association exists between a particular pot-mark and the burial of a young girl.

Two more points in connection with cists may be mentioned. In Raigir XXIV the clearance inside the cist cavity was over 6 feet 6 inches, yet there was nothing in the cist which projected for more than a few inches above the floor-stone. The huge cavity was wasted. Does this imply that bodies were placed in these cists in funeral chairs of some kind? The white ant would have destroyed all traces of woodwork. If this suggestion is correct, much is explained. Cist cavities, up to 9 feet in vertical height, as in Bowenpilly IV, cease to cause surprise, and the extraordinary confusion of bones noted in some cairns is equally explained.

In some cairn fields, particularly the group north of Maula Ali, the cist slabs are so rotten that with the forefinger one can scratch a hole through a slab. Near by lies an edict stone with the common Sun and Moon symbols, and dating back seven centuries or more. This stone is of the same granite and looks as if it had been carved yesterday. It seems that under some circumstances granite decomposes rapidly, and two common agents are salt and wood ash from jungle fires, etc.

Neither of these agents can have acted at Maula Ali. The cist slabs have lain deeply buried under open scrub jungle, excluding wood ash, while, geologically speaking, the Deccan granite areas are well known as being the oldest land surface of our planet and never to have been under the sea. Sub-soil water contains a very small salt element, and this disintegration of cist slabs which is to be seen in some groups confirms surface denudation in suggesting a considerable age for the cairns.

BONES AND BODY POSITIONS.

The commonest body position is with the knees to the chin and the head to the north. As a rule, disintegration is so marked that little more can be made out.

Multiple burials are as common as single, and there is no suggestion that a cist was ever opened at a later date so as to put additional bodies beside those which were placed there originally. In Raigir XVII seven contracted bodies were distinguished, and of these the skulls of three were in good condition.

Extended burials have been found in three cairns at Raigir out of twenty-four. In Raigir XXIV a female skeleton lay on its back, head as usual to the north. The remains of two other persons lay in the cist, but little could be made out. In Raigir II a male skeleton lay, as in Raigir XXIV, with two heaped skeletons to the west. These have been mentioned already, and since under no circumstances can a man come to sit on his own head, it was concluded that the heads had been cut off and thrown into the cist first, followed by the bodies. Meadows Taylor showed, during his excavations at Raichur sixty years ago, that human sacrifice was common, and his findings can be confirmed. In Raigir V the extended skeleton lay on its back, head to the north, but on the west instead of the east side of the cist. In the north-east corner of the cist were two skulls, separate from any other bones. In the south-east corner lay the other parts of the skeletons from which these two skulls had come, and there was little doubt that again we were looking at evidence of sacrifice. Raigir XIII has already been mentioned as another possible example.

Urn burials are found rarely at Raigir and at Dornakal. Burnt bones are also found occasionally at Raigir and Dornakal. At Motamurree, some miles further to the east, cairns of a different type are found, and in these burnt bones seem to be the rule. Co-ordinated investigation alone will decide whether or no these differences in body position, etc., imply a difference in date.

Skulls are disappointing. The three skulls of Raigir XVII were ruined by violent rain, but appeared to have an index of about 75. One of the two skulls in Raigir V which lay in the corner, and were presumably from persons who had been sacrificed, had an index of nearly 90. This figure is without value as a means of determining the racial characteristics of the people who made the cairns, for we must presume that such a skull came from a servant, possibly of a subject race.

The skull from the extended skeleton of Raigir XXIV was in fair condition, and gave an index of 76. This figure is of importance, if any single measurement is ever of importance, for it is safe to conclude that this lady with her lapis beads was the person for whom the cairn has been made.

The cairn builder seems to have had small bones and to have been about 5 feet 6 inches in height. All three extended burials were of this height or half an inch less. There is a great contrast between such bones and the bones which come from persons whom one must presume were sacrificed, for these latter are massive. The huddled position of the bones and the impossibility of clearing the skeleton properly, prevents any exact estimate of height being given, but individual bones are longer than those from persons who clearly belonged to the race of cairn builders.

POTTERY.

This can roughly be divided into two classes : (a) Red pots ; (b) Black pots, with red bases.

(a) *Red Pots.*—Several pots of characteristic size and shape can be seen in the photograph of Raigir XIX (Pl. XXIV, Fig. 2), in position as found. For their support some form of ring-stand is needed, and from the paucity of ring-stands in the burials one may presume that the form commonly in use was of plaited grass or palm leaf, as in use to-day. These pots are oval in section, and the base where it meets the ring-stand is usually spherical (Pl. XXVII).

There is thus a large area of support in whatever position the pot chances to be in. The modern potter has much to say on this point. It is difficult to make a large pot with a flat base, for any attempt to move it results in pressure being exerted on one part of the edge, and the edge crushes in. He makes his flower pots with narrow and very thick edges to ensure strength, and the effect is clumsy. An oval pot, to be supported on a ring-stand, can be made uniformly thin and yet be stronger than the clumsy flat-based pot. The first inventor of this form of pot-shape was a mechanical genius.

These pots are often ornamented with incised patterns, and, rarely, with painted patterns (Pl. XXVII), the design being geometrical, and possibly in imitation of basket work.

The lids of the big pots of Raigir XIX have broken and the fragments lie in the earth which fills the interior of each pot. Three small pots, however, show lids shaped like flat dishes and placed on their pots concavity upwards. Sometimes they have their convexity upwards, and in this respect as well as in their shape are the exact counterpart of lids made to-day. These special lids form the only real direct connection between the burials and modern India.

(b) *Black Pots.*—These were fired base up, and the exposed base is red. The black upper parts are polished. A broken pot of this type can be seen in Raigir XIX to the left of the cist, its red base showing as a thin ring on the right-hand side

A commoner shape for these black pots is dish-like, and as many as eight have been found inside one of the large red pots. They have special lids, conical in section, of varied and sometimes pleasing design. Black pottery ring-stands are sometimes found in position under them.

A full expert description of the pottery has yet to be made. Some pots appear to have been hand-made, others turned on the wheel at a revolution rate of about fifty per minute. Other pots again seem to be partly wheel- and partly hand-made.

POT MARKS.

These present a very interesting problem. Their occurrence is widespread over South India and they have received various titles, such as "potters' marks" and "owners' marks." Largely as a result of these titles they have been considered as having no special interest.

Now these marks are not part of the pot as originally made, but have been scratched on afterwards, and often in the most casual manner. They are not put on by the potter.

The expression "owners' marks" is equally open to criticism. It implies a definite intention to distinguish ownership, and a close study of many marks fails to reveal any confirmatory evidence that the pot marks are of this nature. A glance at the collected marks of one burial, Raigir XXIII (Fig. 1) brings out many points of interest. In the centre of the diagram is an outline drawing of the excavation as seen from the ladder stand. The original position of all the pots which bore marks is indicated round this central sketch. Along-side each pot is a copy of the marks. In this burial two marks were found on each pot, three being the common number elsewhere. Note firstly that at least two sets of marks are found, excluding any idea of ownership of one individual, *e.g.* of the person who was being buried. Again, note the different "handwritings." In most burials where there are many pot marks four or five people were clearly concerned. Note the top left-hand mark, and the same mark at the bottom in the middle. Summon a malee woman who has never held in her hand a pencil, nor at any time made any attempt to write, hand to her a broken piece of pot and a sharp instrument and instruct her to copy a clearly executed mark. She fumbles, repeats lines, and, after infinite labour and with much distress, she produces a result closely resembling that seen in the lower mark of the diagram. Duplication of lines is her strong point. It is obvious that many of these pot marks are the work of ignorant persons who have attempted to copy symbols. Tribal "owners' marks" they may be, but not the "owners' marks" of individuals.

The same mark turns up in burial after burial in the same group, and in group after group, though these be a hundred miles and more apart. We must presume

that centuries at least separate burials which produce the same marks, and combinations of marks; and there is a strong probability that they are symbols of some kind which were of importance in their day. They do not indicate the contents of the pot, for the same mark is found on pots of all sizes and shapes.

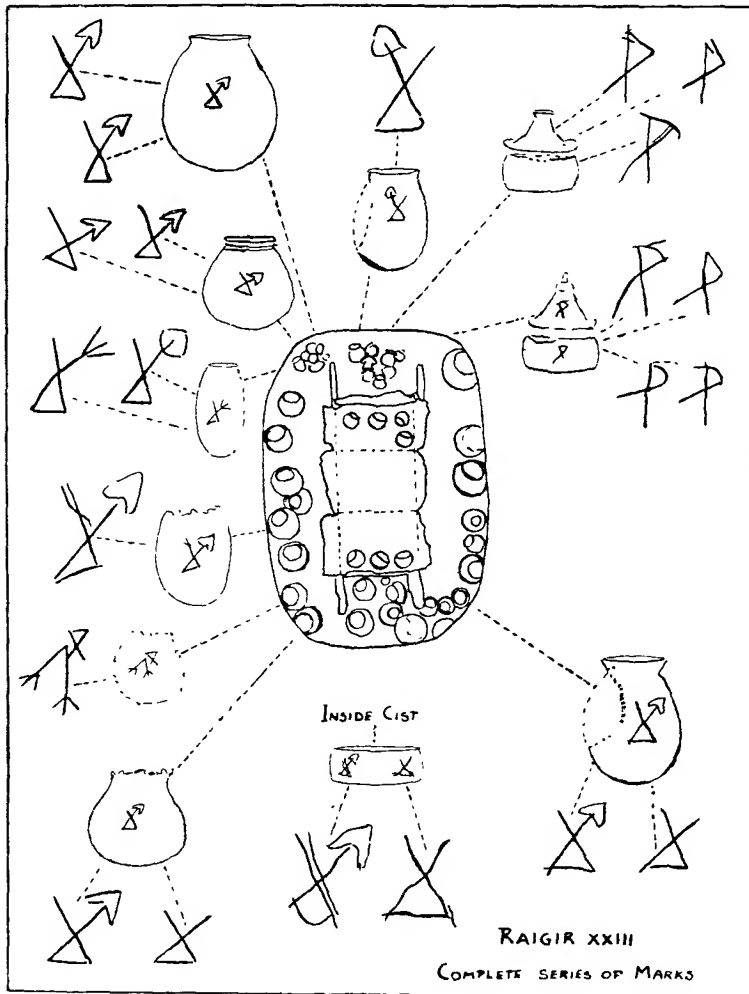


FIG. 1.—RAIGIR XXIII. POT MARKS.

The "double circle" mark has been discussed in connection with Raigir XIII and seems to hint at a symbol indicating a young girl.

The marks found at Raigir, Bowenpilly, Dornakal, Motamurree, and Markapur are shown on one sheet (Fig. 2), and most of these have been found repeatedly. It is rare now to find a new mark.

The first line shows a common set in which one seems to note the development of a simple symbol from a diagram of a crossed axe and spade, or similar objects.

The second line includes two marks closely resembling two early forms of the "Ka" mark of Egypt.

The third line includes variations of a very common combination of a double curve and fork.

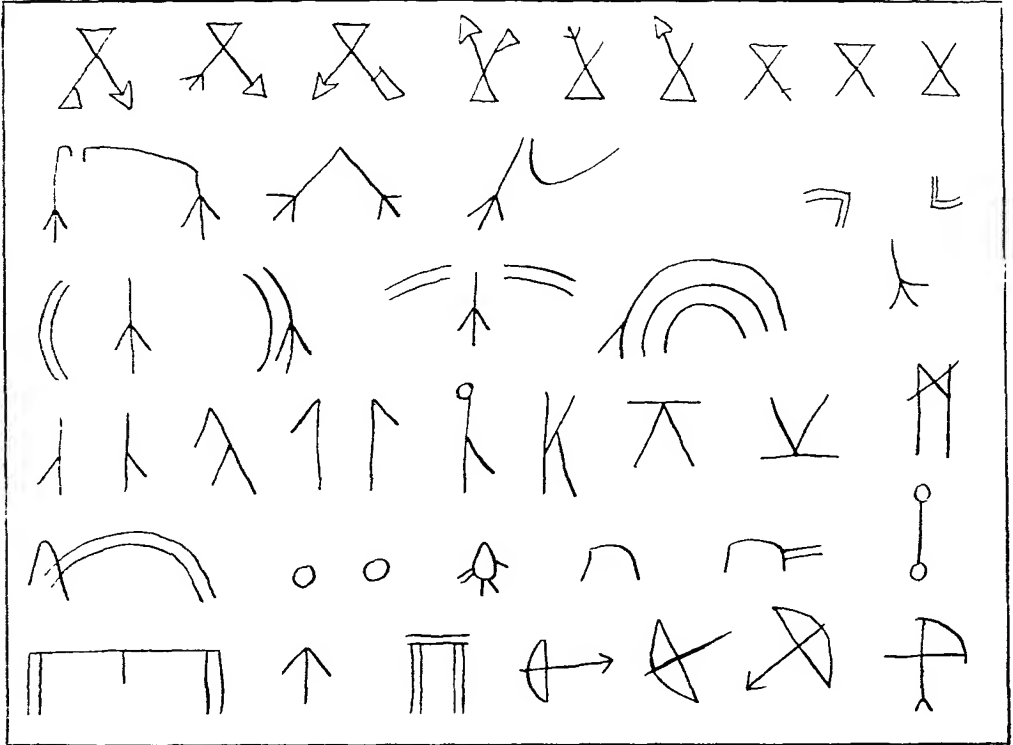


FIG. 2.—COLLECTED MARKS.

The fourth line shows common and simple marks.

The fifth line includes the "double circle" mark, while the sixth line shows among other things a curious and deformed bow and arrow.

It is clear that much further study of these marks is needed.

BEADS.

These are found in a fair proportion of cists. Lapis lazuli, quartz and carnelian are common materials.

They seem to be most commonly associated with female burials, and their small size entails very careful search, and sifting of soil. In two cairns (Raigis. XIII and XVI) large collections of beads were found separate from bones, in the north-east corners of the cists.

The softer stones have been drilled straight through, but in the case of quartz the hole is drilled from each end, and a close examination of the inner surface of the hole shows that the drill was probably a reed covered with emery or other hard powder.

Lapis lazuli has the special interest of being a stone which is probably, but not certainly, foreign to India. Cashmere and Persia are possible sources.

GOLD AND SILVER.

These are very rare, and the writer has only found these metals in one cairn out of over fifty. Among the bones of a small child, ♀ female, in Raigir III were some small beads of lapis and carnelian, and three small wire rings, deeply corroded. An expert mining assayer cleaned portions and found them to be made of silver plated with gold. The gold seems to bring in an association with the ancient gold mines of the "Old Men" of Hutti, 640 feet deep, to this day a mystery.

COPPER.

This is found fairly frequently, and Meadows Taylor had the good fortune to find many bells. The writer has found one only, in Raigir XIII. Two copper bands found attached to this bell fitted the neck of a calf. Dishes are also found, and ornaments, as in Raigir XIV.

These copper articles are mostly broken almost out of all recognition, "the metal having changed back again into an ore," as the assayer put it. The actual compound seems to be a copper silicate.

Bronze does not seem to occur.

IRON.

Iron weapons and other articles are constantly found, and it is clear that these burials belong to a definite Iron-Age.

Usually it is in a sad condition of rust, and it may only be possible to say, "Once upon a time, something made of iron lay here." Standing upright in Bowenpilly VII and in Raigir XIII were two iron tridents, the prong end of the former and the handle end of the latter trident being still metallic. Dishes, arrow-heads, knives, spears, axes, etc., are found. Of all these the most interesting was the Bowenpilly trident, standing up in the air-space of the cist, the lower end of the handle alone being corroded badly. The prongs had been riveted to the handle, and to the shaft a clamp was fixed, holding a peculiar attachment which resembled the framework of a buffalo.

In many countries the presence of iron would establish a limiting date, but it is most unwise to apply to India sequence dates which have been worked out elsewhere. Iron ore, of excellent quality, is present in enormous quantity on the surface, and is readily reduced. A bonfire, or even an accidental forest fire, may result in "bloom" steel being found in the ashes.

Old, forgotten iron workings are noted by mining experts to be of prodigious size. The extensive indigenous iron-works of the villages, studied by Dr. Voysey and others, have now mostly closed down, but it is still possible to get steel of excellent quality, smelted locally. In 1820 traders from Ispahan were taking local steel from Nirmal, and it is probable that the famous Damascus blades were made from this material.

Classical authors, such as Aristotle and Galen, specify Indian steel. Finally, there is the Delhi iron pillar, rustless to this day, 48 feet 6 inches long and 5 feet 6 inches in circumference, whose like could not have been made in Europe till the middle of last century.

Taking the above into consideration, it is clear that no limiting date can be named prior to which iron was unknown in South India.

THE SIGNIFICANCE OF THESE CIST-GRAVES.

In the section of this paper which deals with the physical features of the burials, two points were noted which afford evidence of considerable age: (a) Denudation to a depth of fully 15 feet of the hard soil in which the cists are buried; (b) Rotting of granite slabs.

Some of the pottery bears a close resemblance to that made by the modern Indian potter, and in the case of one special lid-shape this resemblance is so striking as to afford proof that the potter has continued his trade with no violent interruption.

Iron tridents also appear to bring in a direct connection with modern India. With these, resemblances cease.

History gives no clue. As regards the Hyderabad State, we can be confident as far back as Asoka. His edict stone at Maski, near the old gold workings of Hutti, implies that his influence extended at least over the Raichur area of cist-burials and dolmens explored by Meadows Taylor. Further north, history is extended by the Vedic writings, and it is, perhaps, significant that these writings are silent and give no hint of any knowledge of people who used this form of burial.

Legend again affords no assistance. "These are the graves of the enemies of our ancestors." This was the sole legend which Mr. Wakefield could find in the Hyderabad State. Two years ago some cultivators at Raigir built a hut in the centre of a circle. They explained that they had no fear of the ghosts of those buried under them, as the people who were buried had no connection with them.

The customs of modern inhabitants of South India bring in so little connection with the ideas represented by the burials that one is left with the impression that the people who made the cist-graves are a "lost race."

Who, then, were these people? To this question no answer is forthcoming. An early speculator was Miss Graham, who, a century ago, published a sketch of "Indian Cairns," and likened them to "Druidical remains" in England. Meadows Taylor followed, and his sketches of the holed dolmens of France and of Rajunkalur

are reproduced in many works. Attention has also been drawn to the striking resemblance between some of the pot-burials of South India and those of Mesopotamia.

An even more striking series of similarities between the early Indian burials and those of Egypt may here be mentioned.

Mr. H. Balfour drew the attention of the writer in 1920 to the manner in which the polished black pots with red bases from Raigir resembled pottery of the Egyptian 2nd predynastic period.

On the following day another high authority pointed out that the Raigir pot-marks resembled those of other countries, noting particularly the "Ka" mark of Egypt.

In following up these clues, others have come to light. Perhaps the most striking point of all is the manner in which the burials of Tarkhan in Egypt resemble in their general arrangement those of such a place as Raigir. Careful scrutiny of selected photographs is needed to distinguish the remains of an early Indian, surrounded by his pots, from those of an early Egyptian. Further, though different body positions are found, in both countries the long axis of the grave lies north and south.

Again, lapis lazuli beads are found, though the stone is foreign to Egypt and probably so to India. Persia may well be a common source.

It may be remarked that the final typing of this paper is being done in the camp of Prof. Sir Flinders Petrie at Qau el Kebir, where the writer has been privileged to witness the opening of burials from the early predynastic period to the VIth dynasty. The red pots of Raigir resemble in shape, etc., those found in the early dynastic period of Egypt, while some of the first prehistoric Egyptian black and red pots bear a close resemblance to the Indian black and red pots.

As regards the pot-marks, apart from the "Ka" mark, the general resemblance is such that it does not seem wise to dismiss it as coincidence.

Of points in common, but unconnected with the burials, one may mention cultivation by irrigation.

The most striking point of all is the similarity between the intertwined snakes of prehistoric Egypt and those of modern South India (Fig. 3). (*Ancient Egypt*, 1917, Pt. I.)

In this connection Prof. Flinders Petrie has kindly written the following note:—

"The pre-Aryan civilization in India produced pottery resembling some of that of the IVth dynasty in Egypt (2800 or 4800 B.C.). Yet the connection cannot have been direct, as the iron common in India then was not traded to Egypt, or only very rarely.

"The link is indicated by the earliest figures of the intertwined serpents and rosettes found in the 2nd prehistoric period of Egypt (4000 or 6000 B.C.), and also

in Mesopotamia, and much later in India. Though the rosette seems not to have been found with the snakes in Mesopotamia, yet it is likely to occur there, as the rosette is from that region in later times. Thus the indication is of a common source down the Persian Gulf (as other things suggest) and to India.

"The Aryan invasion of India and civilization at the earliest is not before the XVIIIth dynasty, and has nothing to do with the earlier ages in Egypt."

Side by side with these resemblances an equally striking series of differences can be made out, and whatever connection there may have been between India and Egypt in early days seems certainly to have been indirect. There is nothing to show that there was a direct influence on the part of Egypt over India, or of India over Egypt.

A common source of ideas seems the most probable explanation, and the drying up of some intermediate country may well have led both to Egypt and India receiving ideas or peoples from the same parts, and, perhaps, at very different dates.

The iron found in India may be a mere side issue, an industry of jungle tribes; and those who used this form of burial may themselves have been ignorant of how to smelt the ore.

All this, however, is mere conjecture, and the main object of drawing attention to the similarities between early Egypt and India is to emphasize the contention that the mass of material which awaits investigation in India has not yet received the attention which it deserves.

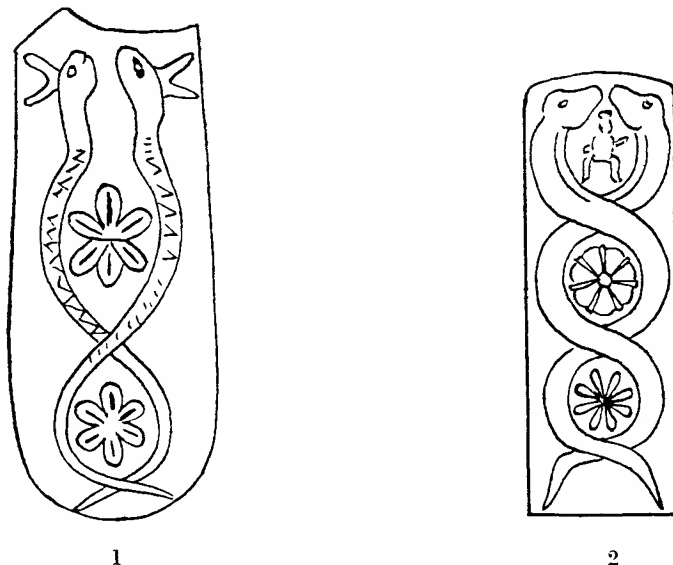
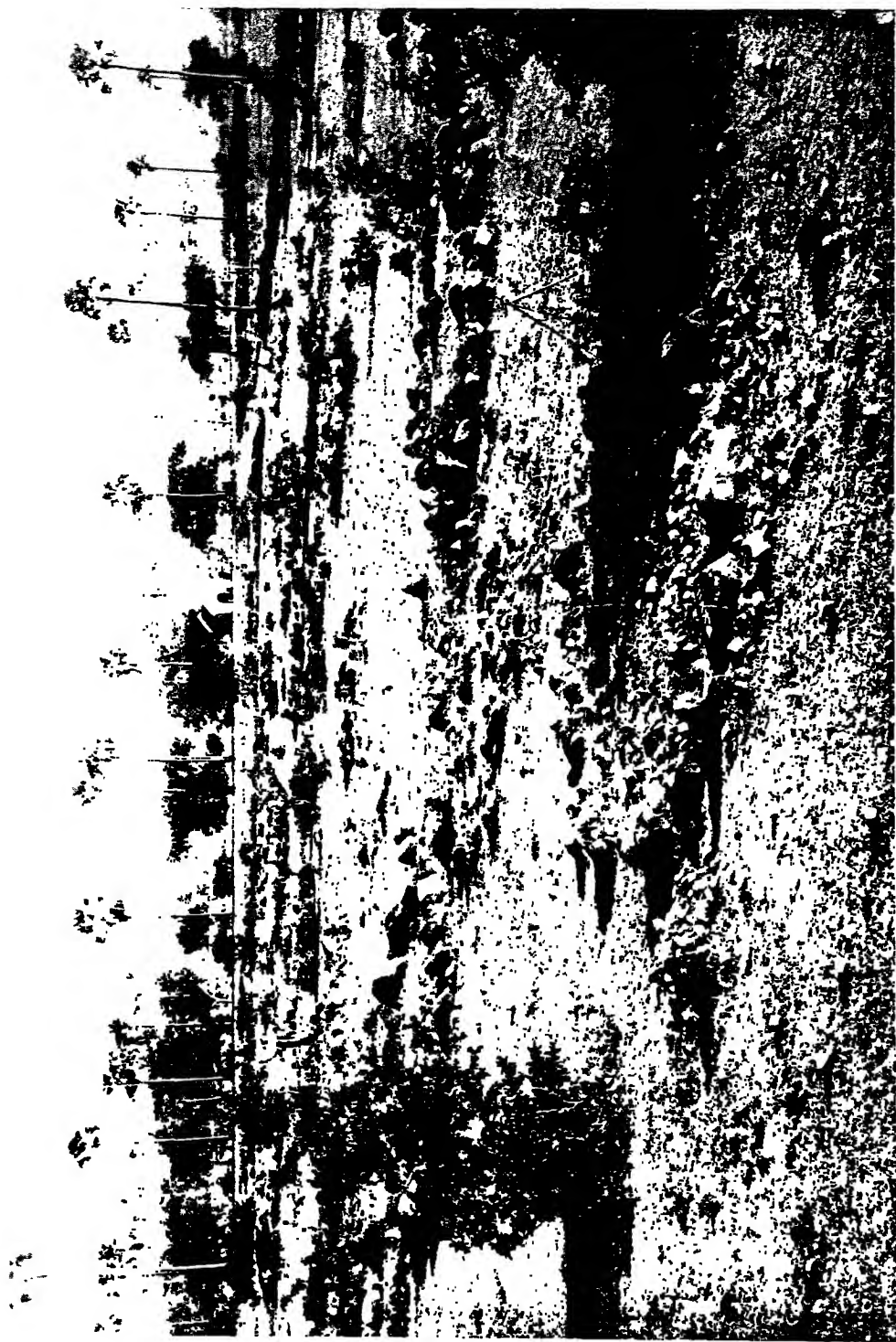


FIG. 3.—ENTWINED SNAKES.

1. Prehistoric Egypt.
2. India (from *Ancient Egypt*, 1917, Part I.).



RAJGIR CAIRN FIELD, SHOWING CAIRNS VIII, VIII, XIN, UNOPENED.

HYDERABAD CAIRN BURIALS AND THEIR SIGNIFICANCE.



SINGLE CIRCLE AT MAULA AIL.

1

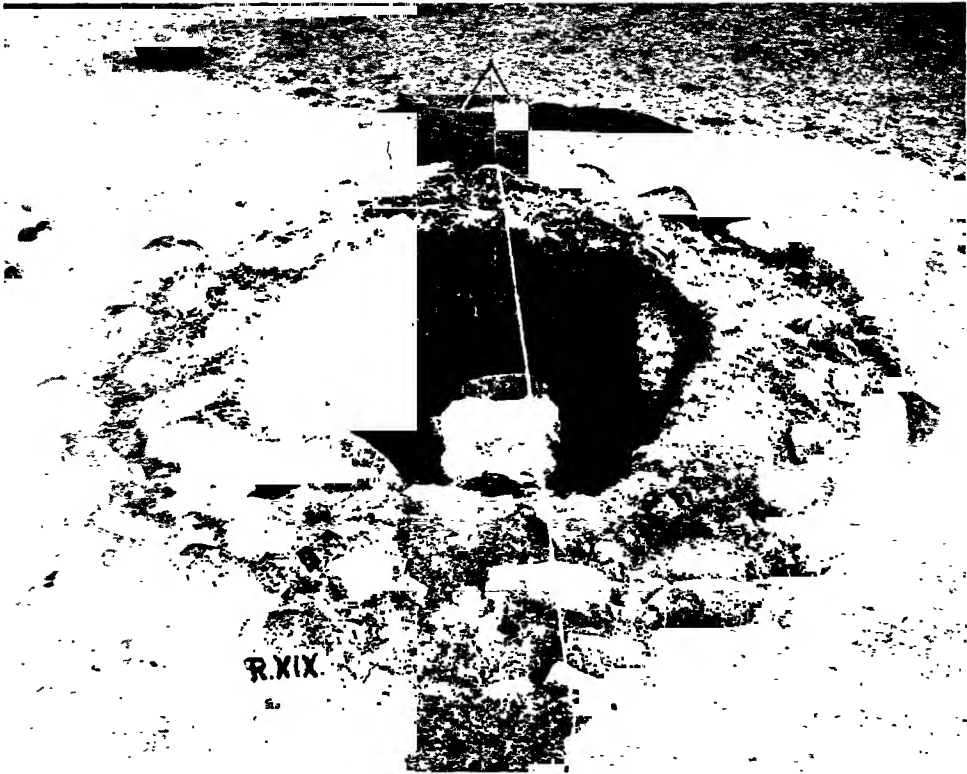


FIG. 1.—RABIR XIX. LOOKING INTO THE EXCAVATION.

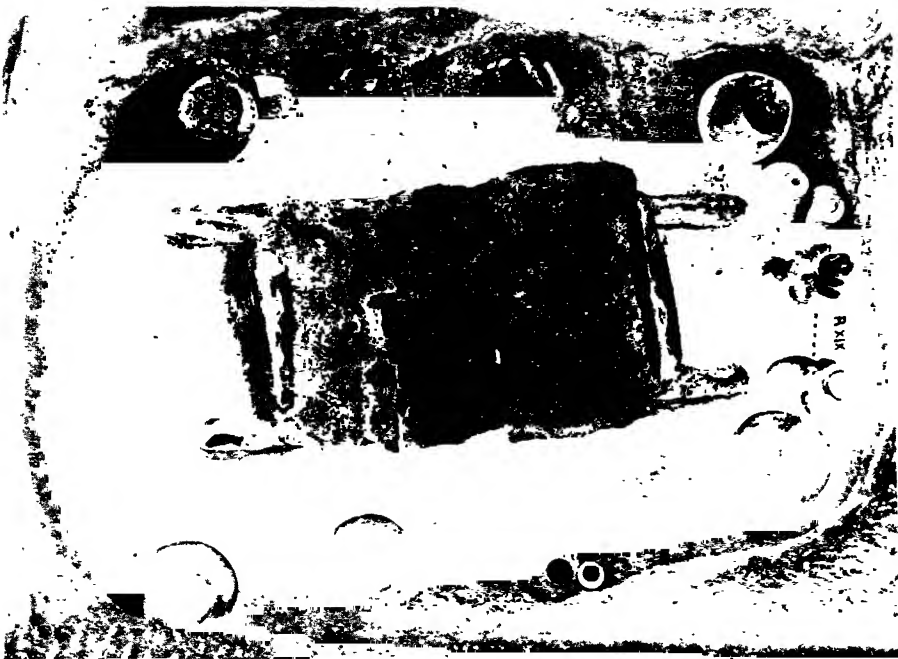


FIG. 2. RABIR XIX. PLAN-VIEW OF EXCAVATION AND CIST, WITH POTS.



1.



2.



3.



4.



5.

BOWENPILLY I, SHOWING SUCCESSIVE STAGES OF OPENING OF THE CIST.

HYDERABAD CAIRN BURIALS AND THEIR SIGNIFICANCE.

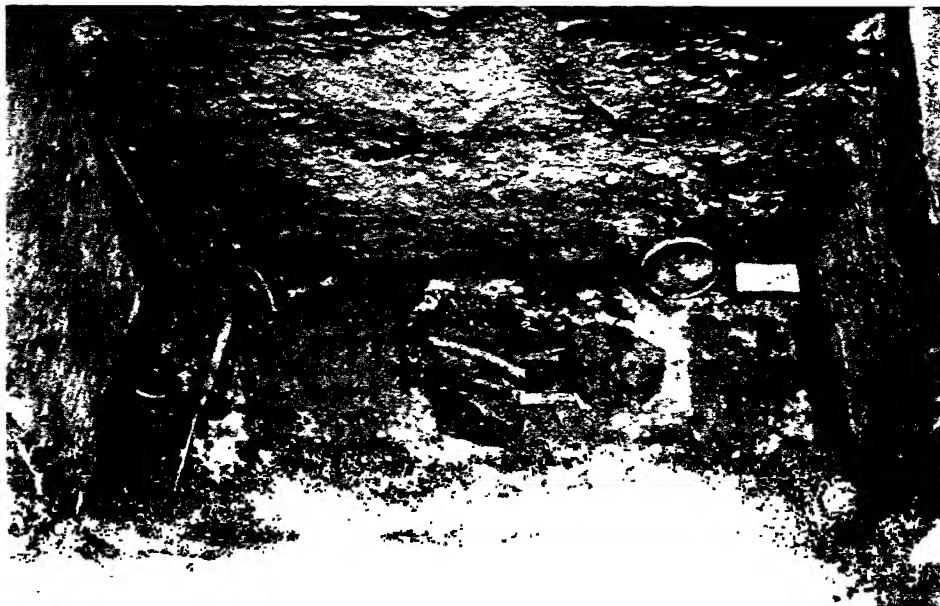


FIG. 1.—RAIGIR XIII. INTERIOR OF CIST, SHOWING BEADS, IRON TRIDENT, URN BURIAL, &c.



FIG. 2.—RAIGIR XXI. INTERIOR OF CIST.

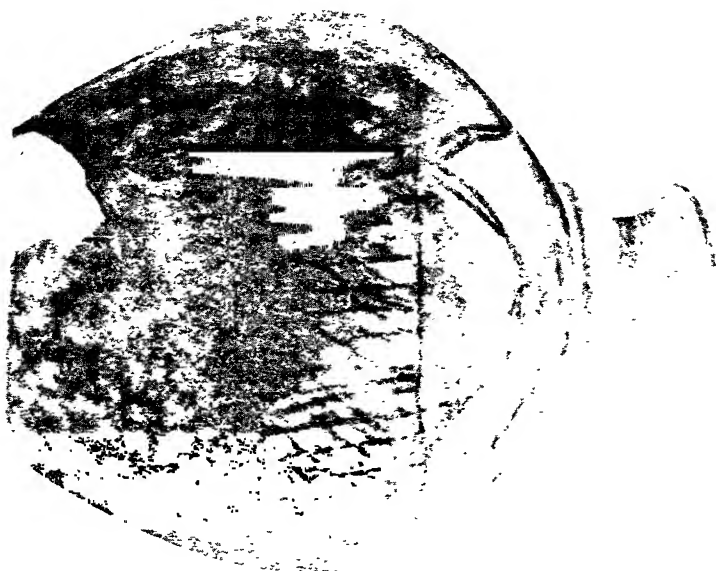


FIG. 2. PAINTED POT FROM THE SAME CAIRN, PARTIALLY
RECONSTRUCTED, ABOUT $\frac{1}{2}$.

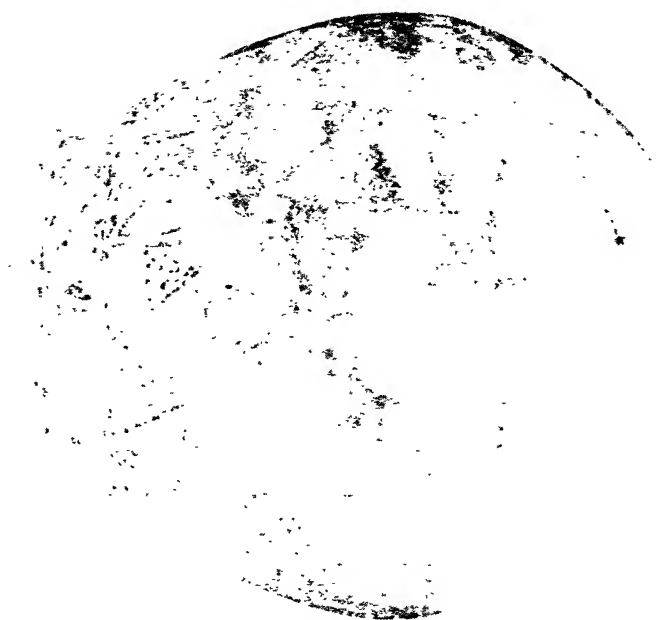


FIG. 1. FINELY PAINTED POT FROM CAIRN N, FOUND
OUTSIDE THE CIST, TO THE SOUTH-EAST, $\frac{2}{3}$.

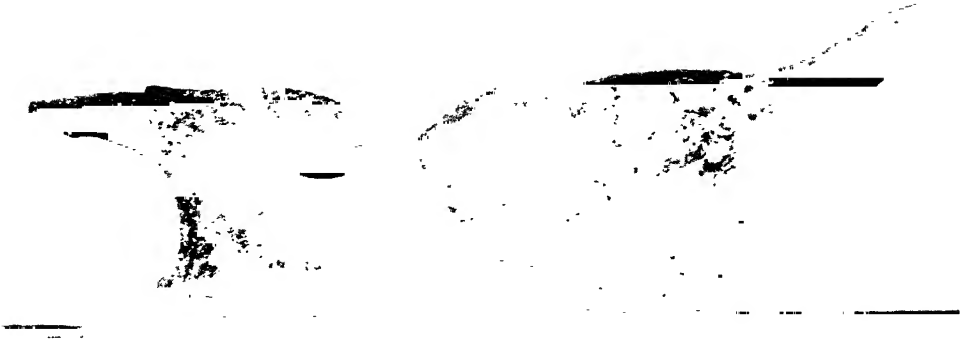


FIG. 1. --MOTAMURREI.



FIG. 2. TO SHOW SOCKET BASES.
HEADS OF RAMS (CLAY) FROM MOTAMURREI.

NOTE ON SOME IRON AGE GRAVES AT ODUGATTŪR, NORTH
ARCOT DISTRICT, SOUTH INDIA.

[WITH PLATES XXIX—XXXII.]

BY F. J. RICHARDS, Esq., M.A., I.C.S.

GEOGRAPHY.

THE river Pālār descends from the Mysore Plateau at a distance of some 120 miles west of Madras through the broken country of the Kangundi chieftaincy. Thence it flows eastward in a picturesque and fertile valley, bounded on the north by the Plateau and its foot-hills, on the south by the hill complex known as the Javādis, till, in the vicinity of Arcot, it emerges on the historic plain of Tondai-mandalam, a focus of South Indian culture from the days when Kānchi (Conjeeveram) was the imperial capital of the Pallavas, till the establishment of Madras as the southern headquarters of the British Raj.

The Pālār valley marks the northern boundary of Tamil culture. It is accessible from the Telugu Deccan on the north by a number of passes which loom large in the military history of South India. It can be easily entered on the west from the Bīramahāl (the basin of the Pennaiyār or S. Pinākini), and from the south by the valley which leads, east of the main mass of the Javādi Hills, from Tiruvannāmalai to Vellore.

At a point about 90 miles from Madras and 14 miles from Vellore the Pālār is joined on the south by an affluent from the Javādis, which in its course through the hills has carved for itself a valley of exceptional beauty. On the right of its main stream, some 18 miles by road from Vellore, is the village of Odugattūr. A mile south of this, on the opposite bank of the stream, in the limits of the "revenue village" of Madaiyappattu, is a group of stone circles of the type familiar in South India (see Pl. XXIX, Fig. 1). Odugattūr stands about 1,074 feet above sea-level; the circles are just above the 1,100-foot contour line; the stream between is about 15 feet below the level of the adjoining land.

Three of these stone circles, numbered 1, 2 and 3 in the plan (Fig. 1), were excavated by Mr. T. N. Hearsey, of the Forest Department, and myself in January, 1916.

GRAVE No. 1.

The circle averaged 43 feet in diameter, and was made up of 28 boulders. The capstone was about 14 feet long and $3\frac{1}{4}$ feet thick; its surface was almost flush with

the ground. The diggers worked from the south side. The soil they turned out resembled the coarse rubble or breccia which passes, in the gneissic areas of South India, as "gravel." Possibly here it is not a natural deposit.

After the coolies had dug northward under the capstone for a distance of about 4 feet, the rubble gave place to fine red earth. It was evident that the capstone overlaid a chamber excavated in the rubble, and that the chamber itself (as is usual in these stone circle tombs) was filled with red earth. Unfortunately it was impossible,

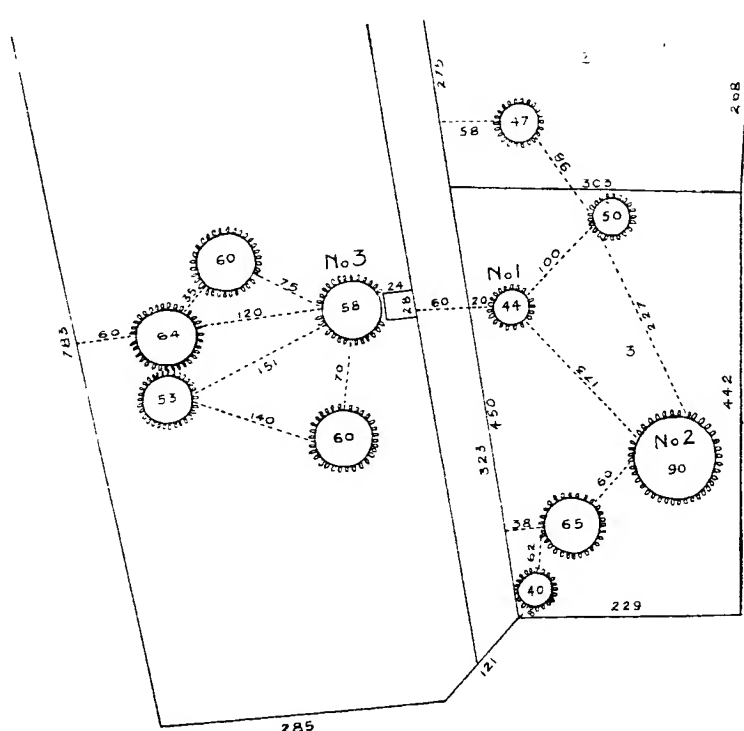


FIG. 1.—SITE PLAN.

Measurements given in links of which 100 = 1 chain of 66 feet. Scale, $\frac{1}{2}$ inch = 1 chain or 1 in 1,584. The figures in the circles denote the number of links in their diameters.

in the time at our disposal, to ascertain exactly the dimensions of the chamber, but the red earth continued northwards to a distance of about $7\frac{1}{2}$ feet from the southern edge of the capstone, giving a width for the chamber of about $3\frac{1}{2}$ feet ($7\frac{1}{2}$ feet less 4 feet).

Further excavation of the red earth revealed, at a depth of about 4 feet 8 inches below the capstone, a horizontal slab of gneiss, forming the floor of the tomb. The slab lay with its longer diameter east and west; it measured about 6 feet long,

3 feet wide at the western end. $2\frac{1}{2}$ feet wide at the eastern end, and the corners of the eastern (or "head") end were rounded to a rough semicircle



The grave furniture comprised—

1. A number of objects cut from chank shells : mostly in the S.E. of the chamber (Pl. XXXII).
2. A stone pestle and mortar (N.W.).
3. A palette (Pl. XXXI, Fig. 2, No. 2).
4. Fragments of human bones (S.E.) and some human teeth (N.W.).
5. Some iron swords (N.E.) and daggers (N.W.) too heavily oxidized to permit of extraction in recognisable form.
6. Two iron axe heads.¹
7. A narrow-necked earthen vessel (Pl. XXX, Fig. 2, No. 3).

GRAVE NO. 2.

The circle, the largest excavated, averaged 56 feet in diameter (inside measurement), and was made up of 33 boulders. The capstone, $2\frac{3}{4}$ feet thick, covered a rectangular chamber, enclosed by four upright sides, orientated with its longer diameter east and west. The dimensions of the chamber were—length 6 feet 8 inches : width, west end 3 feet 10 inches, east end 4 feet 3 inches : interior height from capstone to floor 5 feet 3 inches. The north upper corner of the eastern slab was broken, leaving a semi-circular opening large enough for a slim man to crawl through. The fracture was possibly accidental, due to the superincumbent weight of the capstone. The chamber was filled with soft red earth.

The articles found included :—

- A. In the centre a large broken pot and some bone fragments.
- B. In the N.W. corner a group of three small earthenware vessels, some iron plates, iron knives and spear heads.
- C. In the S.W. corner a fine diorite (?) pestle (Pl. XXXI, Fig. 2, No. 3) and near by a group containing a diorite mortar, another pestle (cylindrical) (Pl. XXXI, Fig. 2, Nos. 4 and 5) and a triangular slab of diorite (?) with rounded corners and edges, which has perhaps been used as a whetstone. (Pl. XXXI, Fig. 2, No. 1).

¹ (a).—Iron axe head, 9 inches long, 2 inches wide at butt, $4\frac{1}{2}$ inches at edge.

(b).—Iron axe head, 9 inches long, $3\frac{1}{2}$ inches wide at butt, 5 inches at edge. The length was probably originally greater, as the butt end was badly disintegrated.

These forms are presumably derivatives from the stone celt through copper and perhaps bronze, and must have been hafted in a cleft stick, a practice still observed in Malabar and in Pudukkōttai. See *C.F.C.*, Pl. 60. For forms, cf. *C.F.C.*, Pl. 19, Nos. 173, 174, and *Rae, A. and P.*, Pl. IV, Figs. 16, 17, 20. (Adichanallūr). See p. 162 for references.

D. At the E. end a group containing a large jar and a conical vessel (both broken), and also a medium-sized jar, associated with a few human teeth.

E. At the N.E. corner another sheaf of iron plates and spear heads, associated with a small earthen vessel.

The iron objects, the characteristic feature of this find, were, most of them, so badly disintegrated by rust that they fell to pieces in process of extraction. The iron sheets deserve special mention. In group E eight sheets were traceable, in group F seven sheets. Their varying shapes and dimensions are roughly indicated in Fig. 2. On one of them is a flattened iron loop, $2\frac{1}{3}$ inches long and $\frac{3}{8}$ inch wide. A few of them have a slightly thickened rim, and in others the rim is recurved. Several of these plates have small copper discs attached to them, some slightly conical, some flat. The largest conical disc measures $1\frac{11}{16}$ inches in diameter and stands nearly

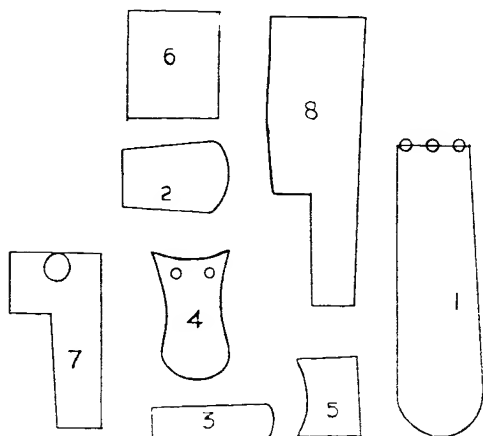


FIG. 2.—IRON PLATES.

(Scale 1 in 20. The circles denote bronze discs.)

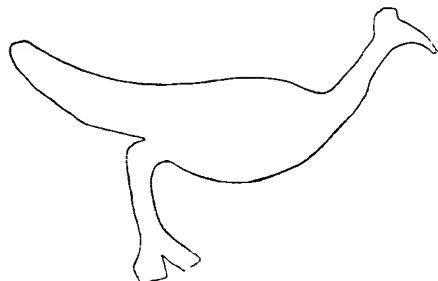


FIG. 3.—BIRD.

(Scale one-half.)

$\frac{5}{8}$ inch high, and is pinned to a "washer" of the same diameter on the opposite side of the sheet. The other conical discs vary between $\frac{13}{16}$ inch and 1 inch in diameter, and each is attached to a small iron loop, $\frac{5}{16}$ inch high and $\frac{5}{8}$ inch to $\frac{3}{4}$ inch wide, on the reverse side of the sheet. The flat discs bear traces of ornament on their margins, but the copper is too disintegrated to permit one to distinguish the character of the decoration.

One very curious form of ornament is attached to one of the iron sheets, viz., a flat sheet of copper cut rudely in the shape of a bird, the species of which it would be hazardous to guess. (Fig. 3.)

GRAVE No. 3.

The circle averaged about 34 feet in diameter and was made up of 25 stones. The tomb chamber was in type similar to No. 1 and had no containing slabs. The

floor slab in this tomb was of irregular oval shape, with a major diameter, from east to west, of 4 feet 10 inches and a width of 2 feet 9 inches ; it was about 3 inches thick and lay 5 feet 2 inches below the capstone.

In this grave the tomb furniture consisted mainly of pottery ; notably two tripod jars of the type shown in Pl. XXX, Fig. 1, No. 1, and two others of the type shown as Fig. 2 of the same plate ; a set of neat globular jars of the type figured in Pl. XXX, Fig. 2, No. 2, and some choice samples of highly finished red and black ware (Pl. XXX, Fig. 1, No. 3, and Pl. XXXI, Fig. 1). Iron implements were represented by two axe heads and a knife 10 inches long, with a maximum width of 1 inch and a tang 2 inches long. The only chank objects were the curious little cone referred to in note (b) to the description of Pl. XXXII, and a few discs and chips, mostly triangular, figured in Pl. XXXI, Fig. 3.¹

A SHRINE.

At the roadside adjoining the circle of Grave No. 3 is a walled enclosure, about 18 feet square, the *temenos* of a stone cult in honour nominally of Ānjanēya (the Monkey God, Hanumān). The cult stone (Pl. XXIX, Fig. 2) is a slab placed on end facing east, uncarved, but black with oil and painted with three *nāmams* (the trident mark of Vishnu), each about 8 inches long. In front of the *temenos*, and about 20 feet from it, is a *dīpastambham*² (lamp-post) of wood, with an iron brazier on top. The cult is partially "brahmanized" in that no blood-sacrifice is offered, the ritual consisting of breaking coconuts and of *abhishekam*, i.e. bathing the stone with *ghi*, milk and the water of tender coconuts, accompanied by offerings of lime fruits and plantains. Special worship is offered in the months of *Purattisi* (Sept.-Oct.), *Kartikai* (Nov.-Dec.) and at *Bhogi-Pongal* (January), and occasionally private vows are made and discharged.

(Descriptive list of objects found follows overleaf.)

¹ Two terra-cotta "spindle whorls" were also found, but unfortunately no note was made at the time as to which grave they came from. They measure $1\frac{1}{2}$ inches in diameter, $\frac{1}{2}$ -inch thick, and the central holes are $\frac{1}{16}$ -inch in diameter.

² Seen in the extreme left of Pl. XXIX, Fig. 1.

DESCRIPTIVE LIST OF OBJECTS FOUND IN IRON AGE GRAVES AT ODUGATTŪR.¹

N.B.—Measurements given in inches.

Abbreviations :—

C.P.A. = *Catalogue of Prehistoric Antiquities* (Madras Museum), by R. Bruce Foote. (Madras, 1901.)*C.F.C.* = *The Foote Collection of Indian Prehistoric and Proto-historic Antiquities* (Madras Government Museum), Part II. Notes on their Age and Distribution. (Madras, 1916.)*Rae, A. and P.* = *A. Rae's Catalogue of the Prehistoric Antiquities from Adichanallūr and Perumbair.* (Madras, 1915.)*A.R.* = *Annual Report, Archaeological Survey of India.*

PLATE XXX, FIG. 1.

No. 1.—Tripod jar : coarse red ware ; tall, tapering downwards, shoulder angular and well defined, maximum width a little below the shoulder ; an even curve from shoulder to rim ; lip thick, everted ; mouth relatively wide.

Measurements : Height, total $13\frac{5}{8}$ inches, base to shoulder $9\frac{1}{2}$ inches ; base to maximum bulge, 9 inches ; shoulder to rim, 2 inches. Width, maximum, $7\frac{5}{8}$ inches ; at shoulder, $7\frac{3}{8}$ inches ; at neck, $4\frac{1}{8}$ inches ; of mouth (total, including lip), 5 inches. Legs, length, $1\frac{1}{4}$ inches ; thickness, $1\frac{1}{8}$ inches to $1\frac{3}{8}$ inches. Cf. *C.P.A.*, Pl. XXVII (locality doubtful). *Rae, A. and P.*, Pl. XII, Fig. 4 (Perumbair). Two specimens of this type were found at Odugattūr.

No. 2.—Tripod jar : coarse red ware ; squat, with sides nearly straight, slightly tapering downwards ; shoulder angular and well defined ; an even curve from shoulder to rim, lip everted ; not so thick as in No. 1. Mouth relatively wide.

Measurements : Height, total, $9\frac{7}{8}$ inches ; base to shoulder, 6 inches ; shoulder to rim, $2\frac{7}{8}$ inches. Width, maximum (at shoulder), 7 inches ; at base, 6 inches ; at neck, $3\frac{1}{4}$ inches ; of mouth (total, including lip), $4\frac{3}{4}$ inches. Legs : length, $1\frac{1}{4}$ inches ; thickness, $\frac{3}{4}$ -inch.

Two samples of this type were found.

No. 3.—Spheroidal jar of very fine thin red and black ware, highly burnished ; profile rounded, slightly oblate, maximum width being above middle of body. No neck or rim, but straight-sided collar $\frac{3}{8}$ -inch high, slightly splayed outward.

Measurements : Height, total, $4\frac{1}{2}$ inches ; at maximum width, $2\frac{1}{4}$ inches ; at base of collar, $3\frac{3}{8}$ inches. Width : maximum, $5\frac{1}{8}$ inches ; at mouth, $3\frac{5}{8}$ inches.

PLATE XXX, FIG. 2.

No. 1.—Large spheroidal jar of coarse reddish-brown ware, black round neck and upper part of shoulder ; slightly burnished. Surface of lower part much disintegrated. Profile rounded ; maximum width somewhat above middle of body. Neck of medium height and width. Mouth rather narrow. Rim broken.

Measurements : Height, total, $9\frac{3}{8}$ inches ; base to maximum width, $5\frac{1}{4}$ inches ; to base of neck, $8\frac{1}{8}$ inches. Width : maximum, $8\frac{5}{8}$ inches ; of neck, $3\frac{3}{8}$ inches.



No. 2.—Spheroidal jar of medium fine red ware, burnished, rather squat, with profile tending to angularity, and neck concave ; fillet at base of neck and double fillet round outside of rim.

Measurements : Height, total, 5 inches ; of maximum width, $2\frac{1}{4}$ inches ; of base of neck, 4 inches ; height of neck, 1 inch. Width : maximum, $5\frac{3}{8}$ inches ; of neck, $3\frac{1}{8}$ inches.

¹ For the photographs, and for permission to publish them, I am indebted to Mr. A. H. Longhurst, of the Archaeological Survey of India. The objects figured are in the Victoria and Albert Museum, Indian Section.

No. 3.—Flask of red and black ware, thicker and coarser than Fig. 1, No. 3, but very highly burnished. Profile sub-angular, the maximum width being a little above the middle of the body. Lower section bowl-shaped, shoulders much flattened, neck rising with abrupt curve from shoulders with straight sides almost parallel. Top of neck broken off. Blackening extends a little below shoulder. Above shoulder surface decorated with band of striations $\frac{1}{8}$ -inch wide.

Measurements : Height of body, $3\frac{1}{2}$ inches : of the maximum width, 2 inches : of the fragment of neck, $1\frac{1}{2}$ inches. Width : maximum, $5\frac{1}{2}$ inches : of neck (exterior), $1\frac{1}{2}$ inches.


Rough cross  scratched on shoulder faintly, and still fainter a few parallel lines . It is doubtful whether these are really owner's marks, but cf. *C.P.A.*, Pl. XXXV, Nos. 1096, 1105, 1106.

No. 4.—Miniature cup of black ware, burnished, on saucer-shaped base, with angular shoulders half-way up the body and a cylindrical collar of height equal to height of body.



Measurements : Height, total, $1\frac{1}{2}$ inches : of maximum width, $\frac{1}{2}$ -inch : to base of neck, $\frac{11}{16}$ -inch : of collar, $\frac{1}{16}$ -inch. Width : maximum, $1\frac{1}{2}$ inches : of mouth (exterior), $1\frac{1}{16}$ inches.

NOTE.—No less than seven other jars were found of rather coarse red ware, similar in form to Fig. 2, No. 2, with fillet round base of neck, but none round rim. The forms vary slightly, but need no detailed description. The measurements average : Height, total, 5 inches : of maximum width, $2\frac{3}{8}$ inches : of base of neck, $3\frac{5}{8}$ inches : of neck, $1\frac{1}{2}$ inches. Width : maximum, $4\frac{3}{4}$ inches : of neck, $2\frac{7}{8}$ inches : of mouth (exterior), $3\frac{1}{2}$ inches.

There are indications of "owner's marks" on several of these pots, but they are not very determinate.

The signs  occur in two specimens.

Another jar was found of similar form and fabric, but larger. Profile slightly sub-angular, maximum width slightly above middle of body. Plain fillet at base of neck.

Neck tall and mouth rather wide : lip everted. Marks on shoulder,  and .

Measurements : Height, total, $8\frac{3}{8}$ inches : at maximum diameter, $4\frac{1}{2}$ inches : base of neck, $6\frac{1}{4}$ inches : height of neck, $1\frac{1}{2}$ inches. Width : maximum, 8 inches : at neck, $3\frac{1}{2}$ inches : of mouth, total (including lip), $4\frac{3}{4}$ inches.


PLATE XXXI, FIG. 1.

No. 1.—Conical bowl of fine red and black ware, highly burnished, sides almost straight and base almost pointed : no neck or rim. Marked with elaborate scratchings, doubtful whether these have meaning.

Measurements : Height, $4\frac{1}{2}$ inches. Width, $6\frac{1}{2}$ inches.

A duplicate of this type, unfortunately broken in transit, measures $5\frac{1}{4}$ inches in height and $7\frac{1}{2}$ inches in width and bears a very elaborate owner's mark, which, owing to the fracture, is incomplete. The fractured edges show that the blackening penetrates the fabric on each side to about half its thickness. Cf. *Rec. A. and P.*, Pl. X, Fig. 6.

No. 2.—Bowl with rim of similar ware, but rather thicker and coarser. Rim recurved outwards

and downwards. Height, 2 inches. Width (exterior), $6\frac{1}{4}$ inches. Marked .
M 2

No. 3.—Small conical bowl, similar in fabric to Fig. 1, but slightly convex in profile. Height, $1\frac{3}{8}$ inches. Width, $2\frac{1}{4}$ inches.

No. 4.—Conical bowl, of fabric similar to foregoing. Of slightly convex profile with neck (splayed outwards) and rim.

Measurements: Height total, $2\frac{3}{4}$ inches; to base of neck, $2\frac{1}{4}$ inches; of neck, $\frac{1}{2}$ -inch. Width: at base of neck, $4\frac{7}{16}$ -inch; of mouth (exterior), 5 inches.

No. 5.—Sub-conical bowl of similar fabric, but with rounded base and more convex profile. Short collar splayed slightly outwards.

Measurements: Height, total, $3\frac{7}{8}$ inches; to base of collar, $3\frac{3}{8}$ inches; of collar, $\frac{1}{2}$ -inch. Width: at base of collar, $5\frac{1}{16}$ inches; at mouth (exterior), 6 inches.

PLATE XXXI. FIG. 2.

No. 1.—Triangular slab of diorite, artificially smoothed on both sides, with edges also artificially smoothed (Grave No. 2). Length, $8\frac{1}{4}$ inches; breadth, 5 inches; thickness, $2\frac{1}{4}$ inches to $2\frac{7}{8}$ inches.

No. 2.—Palette of pale green stone, with perforation at $\frac{5}{8}$ inch from centre of narrower (upper) end (Grave No. 1). Length, $7\frac{1}{4}$ inches. Width: maximum, 4 inches; minimum, $3\frac{7}{8}$ inches; thickness, $\frac{3}{8}$ -inch to $\frac{1}{2}$ -inch.

No. 3.—Pestle of black diorite, highly polished (Grave No. 2). Length, $9\frac{3}{8}$ inch; thickness, maximum, $2\frac{7}{8}$ inches; minimum, $1\frac{3}{4}$ inches. Cf. *C.P.A.*, Pl. XXXI, No. 1279 (? Jāla, near Bangalore) and *A.R.* 1908-9, Pl. XXXV, Fig. 19 (Perumbair).

No. 4.—Pestle of diorite, cylindrical (Grave No. 2). Length, $4\frac{1}{2}$ inches; thickness, $2\frac{1}{2}$ inches.

No. 5.—Mortar of diorite (Grave No. 2). Maximum diameter, $6\frac{7}{8}$ inches; maximum thickness, $2\frac{7}{8}$ inches.

NOTE.—In Grave No. 1 a similar pestle and mortar were found, of the following dimensions:—

Pestle. Length, $4\frac{3}{8}$ inches; thickness, maximum, 2 inches; tapering to $1\frac{1}{8}$ inches.

Mortar. Maximum diameter, $6\frac{3}{8}$ inches; maximum thickness, $2\frac{3}{4}$ inches. Cf. *C.P.A.*, Pl. XXXI, No. 1280. (Jāla, near Bangalore.)

PLATE XXXI, FIG. 3.

No. 1.—Circular discs of shell. On one side of each six minute triangular flakes have been removed, thereby producing the design of a six-spoked wheel. The edges of these discs are slightly bevelled. The discs are just over $\frac{1}{2}$ -inch in diameter and about $\frac{1}{16}$ -inch thick.

Nos. 2 and 3.—Triangular chips of shell, the longer type measuring a little over $\frac{1}{2}$ -inch in length and from $\frac{1}{4}$ -inch to $\frac{3}{8}$ -inch wide at base. The equilateral chips measure, each side, about $\frac{1}{4}$ -inch.

A few other shapes were found, some crescentic, some rectangular. In all, four discs and about 20 chips were found. Professor Sir Flinders Petrie, to whom they were shown, suggested that possibly they had been used in wood inlay work, the wood itself having perished.

PLATE XXXII.¹

Nos. 1 to 4.—Discs of chank shell, each with a hole in centre, similar to those figured in *Rae, A. and P.*, Plate XI, Figs. 19 and 24. Cf. *A.R.* 1908-9, Pl. XXXIII, Fig. 27. The incised designs, however, differ from those found at Perumbair. The basis of the design is a number of groups of concentric circles linked together by two or more curved lines, these curved lines being arcs of circles, the centres of which (except in the case of 4) would be exterior to the discs. The central hole of each disc is also surrounded by two or more concentric circles, and concentric with these are two or more circles also cut round the margins.

¹ For this photograph I am indebted to Mr. Stanley Clarke, of the Victoria and Albert Museum, Indian Section.

In No. 1 there are eight linked groups of concentric circles, three circles in each group: the linking arcs are made up of three lines each, the space between the two outer circles being decorated with a chevron band. In the central group of circles there are four circles, the space between the two inner circles being also decorated with a chevron band. The peripheral circles are also fourfold, with a chevron band between the two inner circles.

In No. 2 there are only four groups of linked circles, the linking arcs forming a four-rayed star. Each group is made up of three circles, the outermost circle in each group being fringed with a number of minute outward-pointing rays, forming "rosettes." Each link is made up of three arcs, the innermost (*i.e.* that nearest to the centre of the disc), being similarly adorned with minute rays, pointing towards the centre of the disc. The central group is made up of three concentric circles, the innermost of which is fringed with inward-pointing rays. The peripheral circles are three. Two other discs bearing this design were found.

No. 3 resembles No. 1, except that there are only six instead of eight groups of linked circles, and that each group is made up of four circles instead of three. There are also four in place of three linking arcs, and the chevron bands are absent. The central group has two circles only, and there is a zigzag band between these. There are three peripheral circles, the outer two enclosing a zigzag band: the inner is fringed with inward-pointing raylets.

The linked groups of No. 4 are four in number, each group containing four circles, the outermost being ornamented as in No. 2 with minute outward-pointing rays. These linked circles are, however, not linked with each other but with the central group of circles, on the principle of a right or "clock-wise" pointing *swastika* with curved arms. The central group consists of three circles, the inner and outer of which are fringed with minute rays pointing inwards and outwards respectively. The peripheral circles are three in number.

The diameters of these discs range from $2\frac{1}{2}$ inches to $2\frac{7}{8}$ inches.

Nos. 5 and 6 are cigar-shaped pieces of shell (presumably chank), perforated through their major axes. They measure $4\frac{1}{4}$ inches in length and $\frac{1}{2}$ -inch in thickness. The perforation is very clean cut.

A number of pieces of similar shape were also found, some of them with traces of non in the perforation, suggesting the inference that these objects are knife handles.

No. 7 is a chank shell with the apex and columella removed, and incised near the margin of the outer whorl with five parallel bands, of which the two outermost and the central band are plain, and the two intermediate are decorated with chevrons. The innermost bands (*i.e.* those farthest from the margin of the whorl) are decorated with a fringe of minute rays like those fringing the circles in Nos. 2 and 4. The upper whorls are decorated with two groups of concentric circles. Length, $6\frac{1}{2}$ inches: width, $3\frac{7}{8}$ inches.

Two specimens of this type were obtained. Cf. *Rae, A. and P.*, Pl. XI, Fig. 12, the decoration of which is, however, different from that above described.

No. 8 is the columella of a chank decorated in a manner similar to No. 7, except that there are only two plain bands and one chevron band. The side of the columella opposite to that shown in the Plate has been sawn flat. Length, $4\frac{1}{2}$ inches. Width, $1\frac{1}{2}$ inches.

Two specimens of this type were obtained. Cf. *Rae, A. and P.*, Plate XI, Fig. 30. *A.R.*, 1908-9, Pl. XXXIII, Fig. 26.

NOTE.—The following objects, not figured, also deserve note:—

- (a).—"Sugar-boat" shaped piece of shell (? the columella of a chank?), sawn off at the base and perforated longitudinally. Length $1\frac{1}{2}$ inches. Width, $\frac{4}{8}$ -inch. Length of perforation, $1\frac{1}{2}$ inches.
- (b).—An object, the purpose of which is not obvious, consisting of three spiral whorls of a gasteropod mollusc (? chank), the apex having been sawn off and the columella removed. The truncated pyramid resulting is $1\frac{1}{2}$ inches high, $2\frac{1}{2}$ inches wide at base and $\frac{7}{8}$ -inch wide at top. Just below the upper margin the walls of the shell have been drilled with two holes, not quite opposite each other.

THE BRACHYCEPHALIC SKULL.

By F. G. PARSONS, F.R.C.S., F.S.A.

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THE present paper is a study of brachycephalic skulls, partly carried out by comparing dioptographic sketches one with another and partly by reducing the whole series to composite sketches from three points of view. Some anthropologists prefer averages, others groups in contrast, and as probably both have sound reasons for their preference, we may hope to learn something from each method.

I have published in this *Journal* standard contours of Bronze Age or Beaker Folk skulls (vol. xliii, p. 550), as well as of British Long Barrow skulls (vol. li, p. 55), while in the Arris and Gale Lectures at the Royal College of Surgeons (*Lancet*, April 20th, 1918) I was able to show the standard of thirty skulls of Londoners of the 18th and 19th centuries, from the Clare Market region, and to point out that, as far as the measurements taken were the same, this latter series closely agreed with the two other larger series of London skulls, from Whitechapel and Moorfields, recorded by the late Dr. Macdonell (*Biometrika*, vol. iii, 1904, and vol. v, 1906).

In this series of European brachycephals thirty male skulls were measured, and it will be seen by the list that they ranged from Lapland to Naples, from Britain to Turkey. One Armenian skull, it is true, is included, which perhaps may be objected to as not European, but there are so many Armenians now in Europe that I think its inclusion is justified.

The skulls are for the most part in the College of Surgeons Museum, and I am indebted to the kindness of the authorities there for permission to take dioptographic tracings of them. The few which are not from that College are in my own collection at St. Thomas's Hospital.

No doubt a series larger than thirty would have increased the value of the averages, but not, I think, by very much, because I find that a contour obtained from a random sampling of fifteen of these skulls is so close to that given by the thirty that all the deductions founded on the larger number would have been justified equally by the smaller. Moreover, as each skull needs 117 measurements, the line must be drawn somewhere.

It is often objected that in one series of skulls the range of variation may be slight, and of these fifteen, or even ten, would be ample upon which to found an average, while in another series it might be so great that thirty would not be enough.

This difficulty may be decided by taking the coefficient of variation of different measurements and seeing whether they are above or below those of other series regarded as homogeneous by common consent; or by placing the various tracings side by side on a reduced scale as I have done on pp. 168, 173.

Brachycephalic skulls have been dealt with already by Toldt (*Sitzungsber. Akad. Ges.*, Wien, XXIV, 1894), but from rather a different point of view. He was chiefly concerned with the local and subracial differences, such as Alpine and Slavonic, while my main interest is to produce a set of average contours of the group and then to compare it with other racial types.

I hope that an attempt to produce standard contours of skulls from different aspects, which may be placed side by side, or superimposed without the fear that abnormal specimens may have been selected, will justify the space occupied and also the time and labour which I have expended on this new method of craniometry.

Most craniologists are, I think, familiar with my method of obtaining standard reconstructions of series of skulls, but in each attempt some little modification or improvement suggests itself. In this attempt I have placed a letter to each column of measurements, corresponding to one on the reconstructed skull, so that a glance will show the exact points between which the measurements were taken. Again, I have to admit that Martin's dioptograph is an instrument which needs care and practice to obtain really accurate results, and I never pass a tracing unless it reproduces exactly the length and the breadth, in several places, of the actual skull.

Another check on the accuracy of the tracing is that the three contours are placed side by side and, if they do not correspond as accurately as an architect's plans, the cause of the misfit has to be found and rectified or explained.

Errors in measuring the individual records and in working out the averages will show themselves when the average plans are reconstructed and the different views fitted together, but, at the same time, critics must recognize that small discrepancies must sometimes occur and need common-sense adjustment, owing to the fact that we are dealing with what have been living tissues and not machine-made structures. Often, for instance, the dioptograph gives a slightly greater length to a skull than the callipers allow and the explanation is that skulls are never absolutely symmetrical, for the frontal region may project a little on one side and the occipital region on the other.

Other little apparent inconsistencies between the orthogonal projection and the callipers are familiar to every worker and are due to the line measured not being parallel to the glass of the dioptograph. For this reason the width of the external opening of the orbit always appears less than it really is, though the actual width can be worked out by combining the side and front views. But, when all the weaknesses of projection contours are allowed for, there is no doubt that these records are infinitely more accurate than photographs, or even than the picture conveyed to the brain by binocular vision.

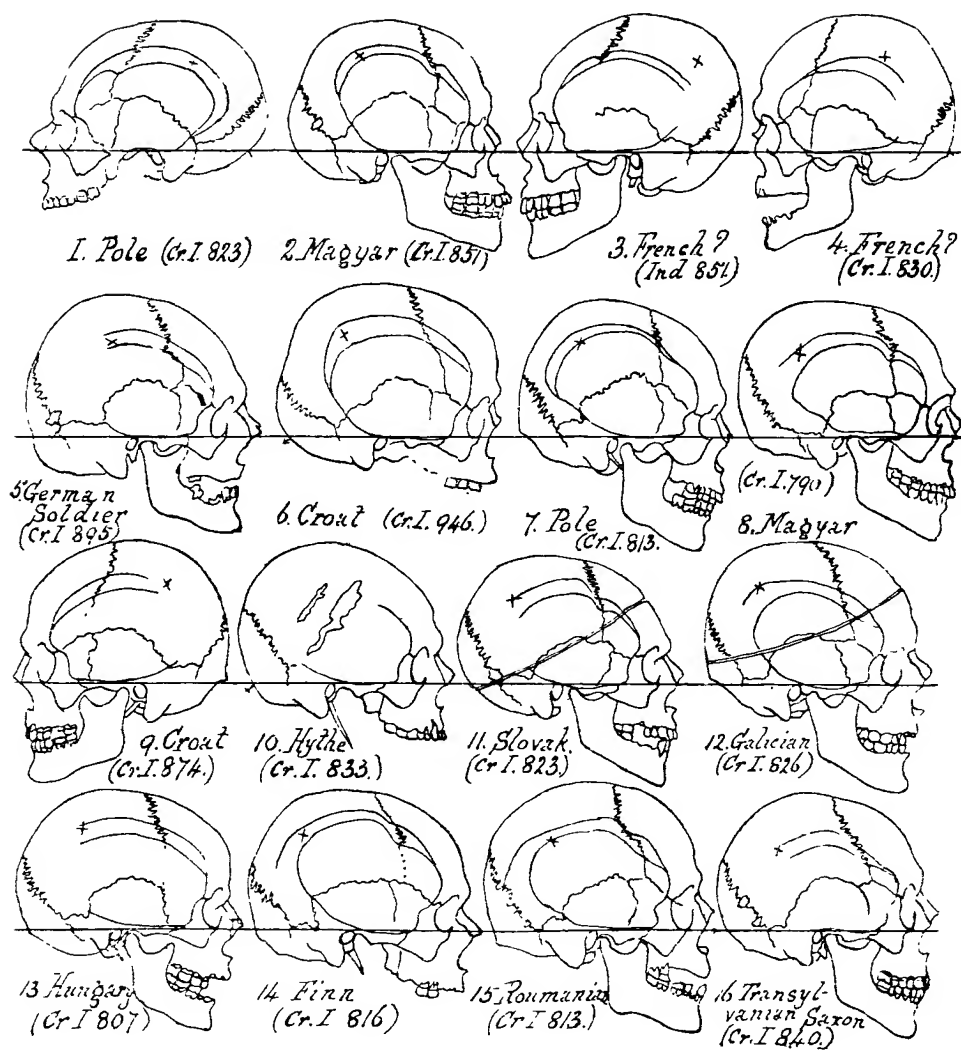


FIG. 1.—NORMA LATERALIS OF BRACHYCEPHALIC SKULLS.

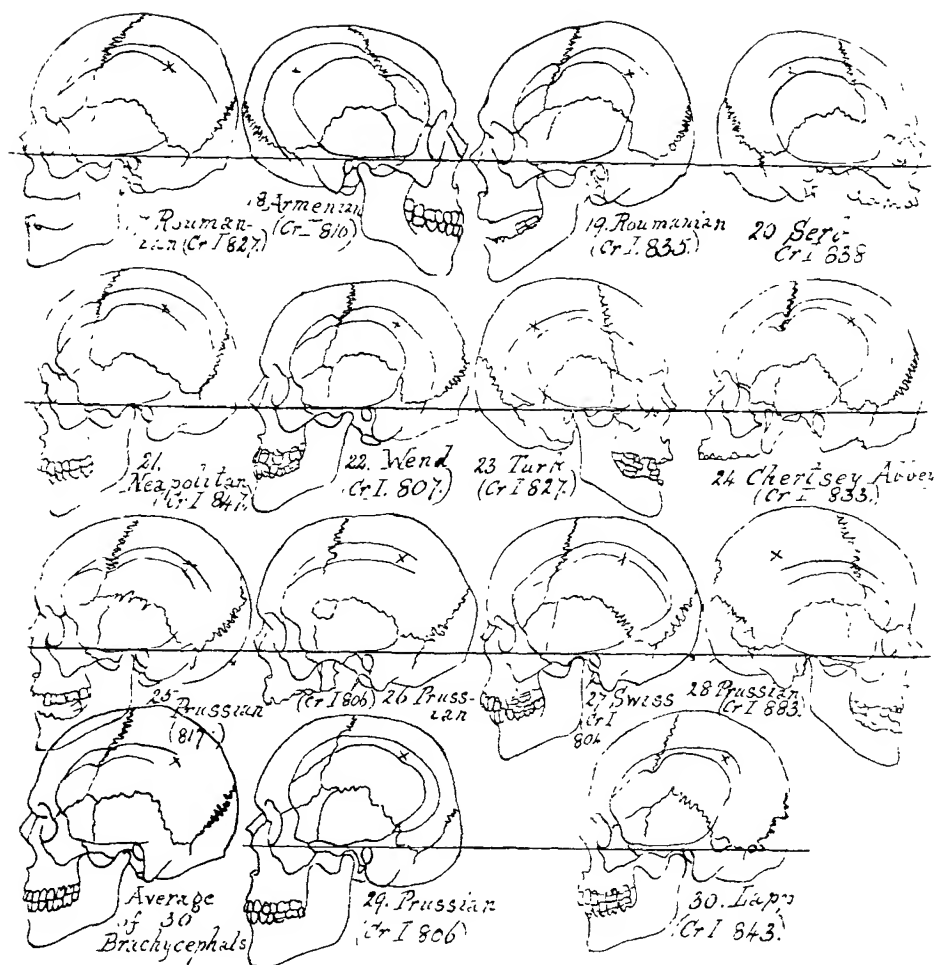


FIG. 1 (cont.)—NORMA LATERALIS OF BRACHYCEPHALIC SKULLS.

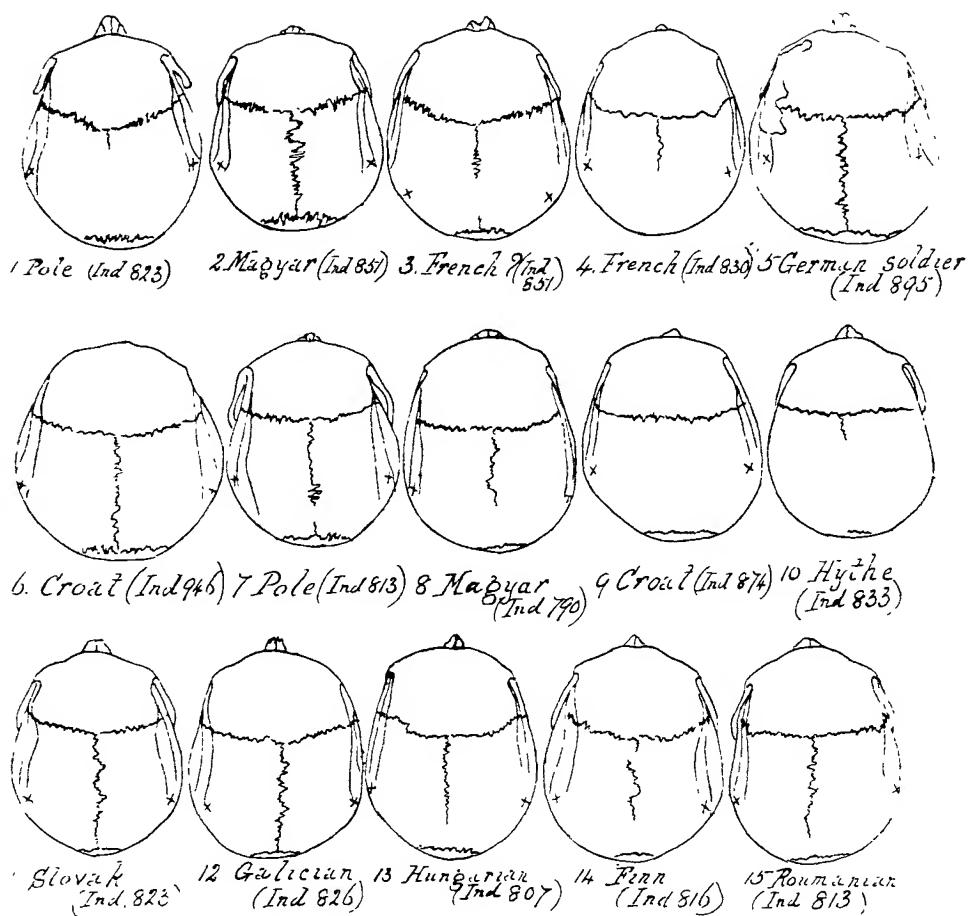


FIG. 2.—NORMA VERTICALIS OF BRACHYCEPHALIC SKULLS.

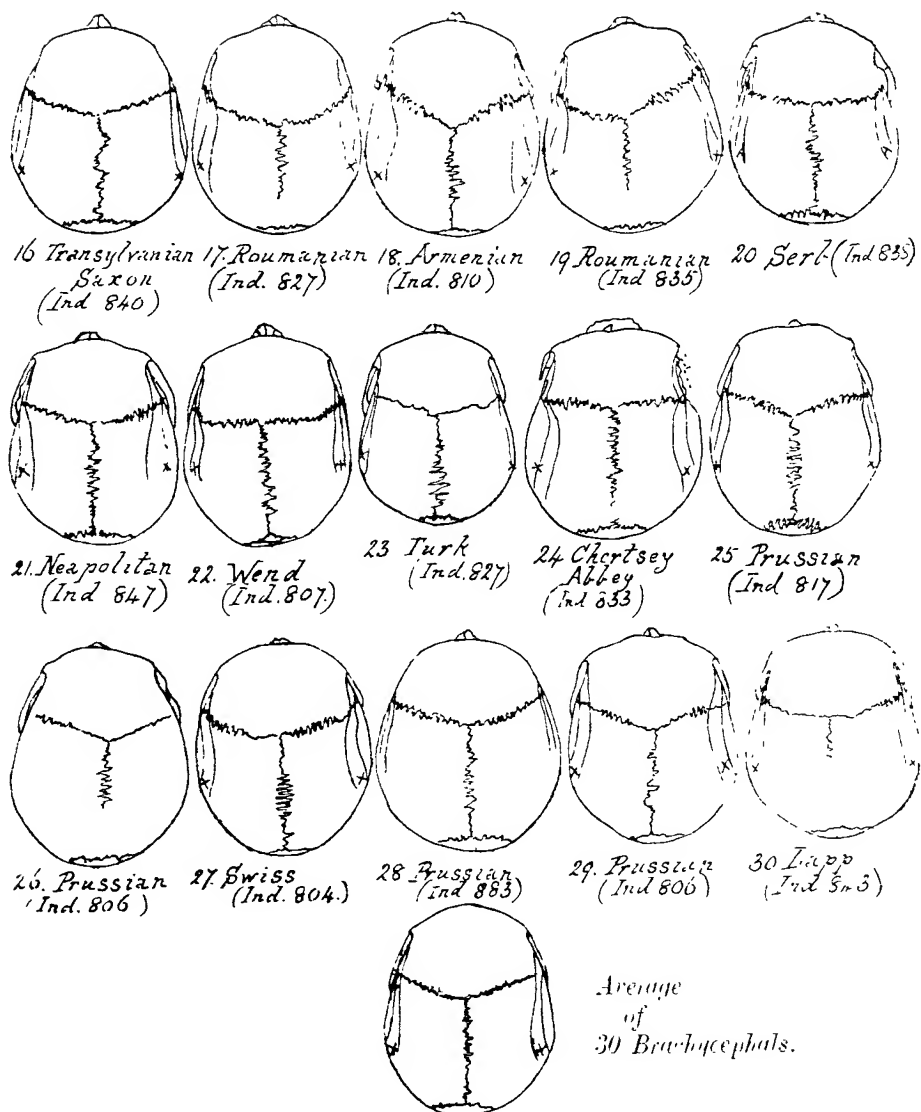


FIG. 2 (contd.).—NORMA VERTICALIS OF BRACHYCEPHALIC SKULLS.

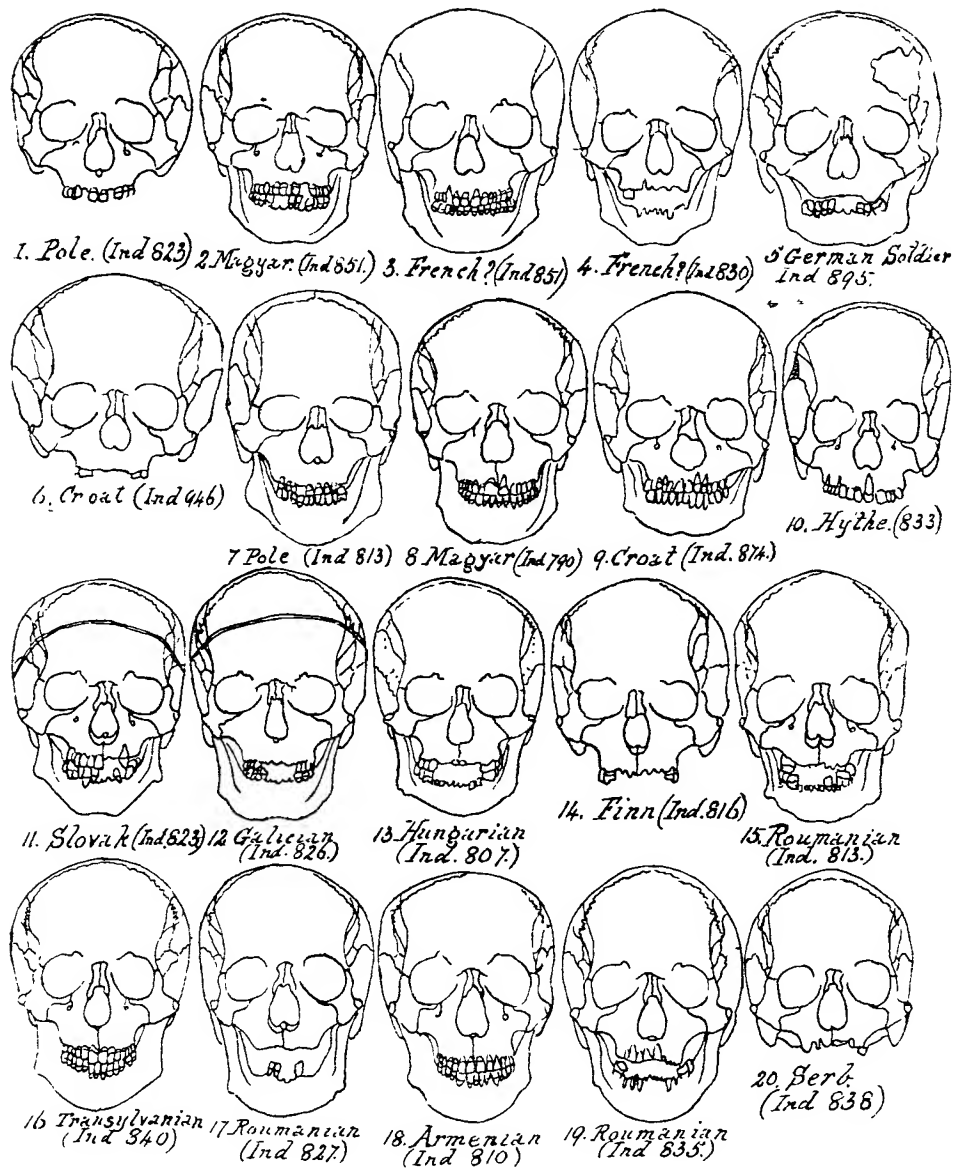


FIG. 3.—NORMA FACIALIS OF BRACHYCEPHALIC SKULLS.

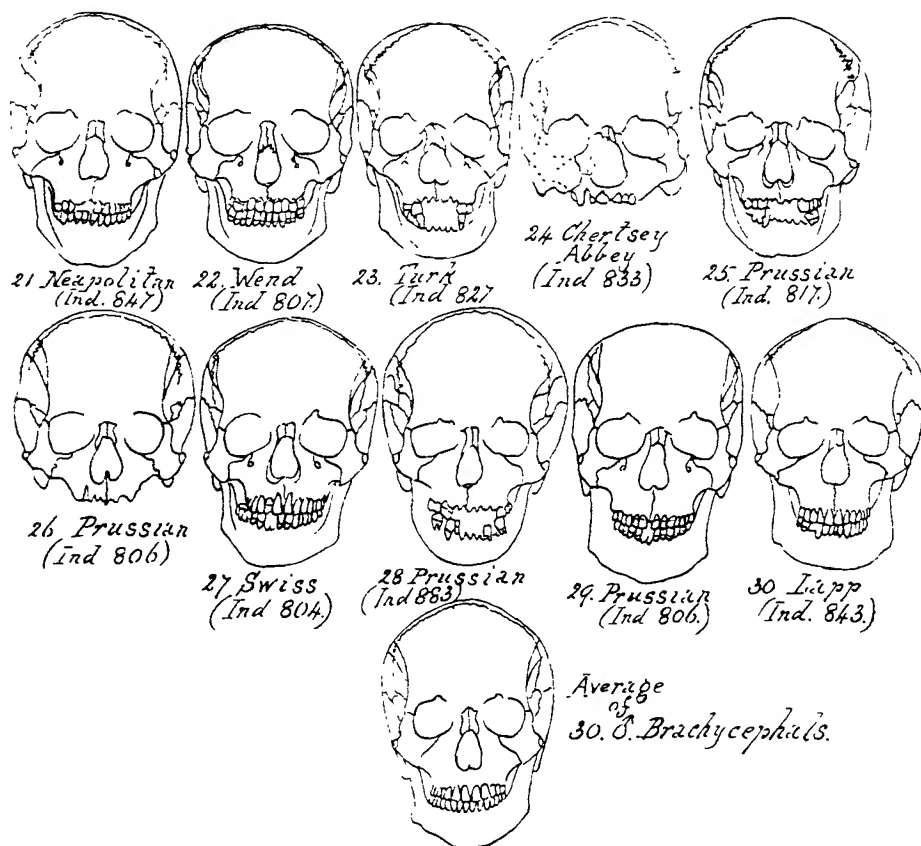


FIG. 3 (contd.).—NORMA FACIALIS OF BRACHYCEPHALIC SKULLS.

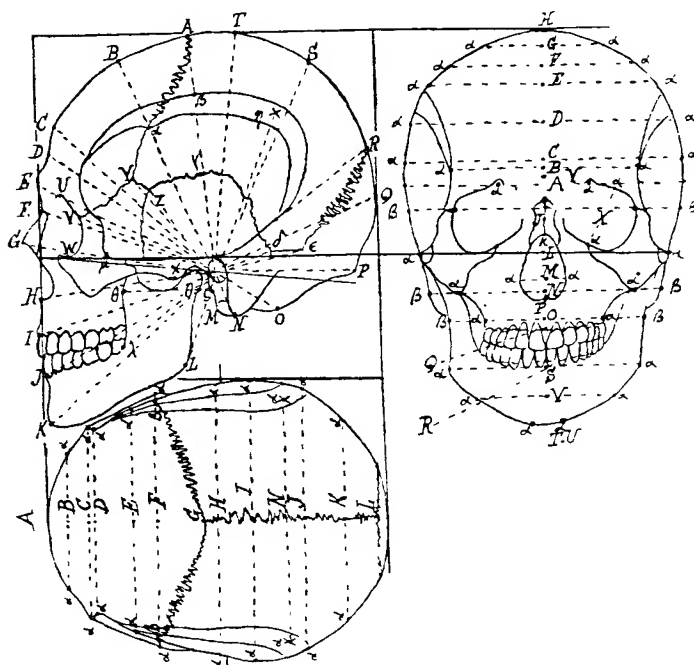


FIG. 4.—STANDARD CONTOURS OF 30 EUROPEAN BRACHYCEPHALIC SKULLS.

Having given the contours and actual measurements of the individual skulls, and the mean standard contours reconstructed from them, it may be interesting to compare them with reconstructions of other series of skulls, which, I freely confess, are not as numerous as I would like them to be, but still are increasing each year and beginning to answer some of the riddles which craniologists have asked themselves for so long.

In the first place, one would like to know definitely wherein the greater length of the dolichocephalic skull lies, but here we are at once met by the further question of how much the lower cranial index is due to increased length, and how much to diminished breadth.

Personally, I often doubt whether the universal reverence paid to indices is altogether justified: whether everyone really understands that, in giving the ratio of the length to the breadth, the latter may be no more a constant than the former, and that in two skulls of the same cranial index one may have the average cranial length of the series with an abnormal breadth, and the other the average breadth with an abnormal shortness.

As an example, let me instance two actual skulls with the cranial index of 921. One of these is 140 mm. broad, a fair average breadth, and only 152 mm. long, while the other is 164 mm. broad and 178 mm. long, a fair average length. In one case the skull has been abnormally shortened, in the other abnormally widened, without the index giving any clue as to which process has occurred. The first point then on which we need some definite information is whether brachycephalic skulls are brachycephalic because they are shorter or because they are broader than dolichocephalic, or, if they are both, whether the shortening and broadening are in anything like the same ratio. Clearly, if we had some standard contours of the normal verticalis of long and short skulls superimposed, we might get some light on this question. I think that, until we get something better, we may use this series of thirty skulls, taken as they came from the College of Surgeons and my own collections, as representing something very near the average contour of male European brachycephals, and I have to contrast with them the average contours of twenty-seven male Anglo-Saxons (Fig. 5). A glance shows that the Saxons are a good deal longer (192 mm. against 178 mm.), but not much narrower (143 mm. against 148 mm.), than the brachycephals. In other words, the length of 178 has gained 14 mm., or 7.86 per cent., while the breadth of 148 has lost 5 mm., or 3.38 per cent.

Another contrast is with a series of thirty Clare Market male skulls of the 18th century (Fig. 6). Here we find that the length has increased by 5.61 per cent., while the width has decreased by 4.1 per cent.

In the Whitechapel series of skulls, recorded by Dr. Macdonell (*Biometrika*, vol. iii, March, 1904), the average length is 189 mm., a gain of 11 mm. on the 178 of the brachycephals, or 6.18 per cent., while the breadth is 140.5 mm., a decrease of 7.5 mm. on the brachycephalic average of 148, or 5.07 per cent.

In the Moorfields series, recorded by the same author (*Biometrika*, vol. v, October, 1906), the length is also 189 mm. and the breadth 143 mm., giving an increase of 6.18 per cent. in length and a decrease of 3.38 per cent. in breadth.

If these examples, with one or two others, are tabulated for comparison, we find the long skulls differing from the short in the following manner :—

	Increase of Length Percentage over Brachycephaly.	Decrease of Breadth Percentage from Brachycephaly.	Length.	Breadth.
27 Anglo-Saxons	7.86	3.38	192	143
30 Clare Market	5.61	4.10	189	142
135 Whitechapel	6.18	5.07	189	140.5
44 Moorfields	6.18	3.38	189	143
100 Rothwell	4.49	4.10	186	142
120 Camb. Dissecting Room ...	4.66	3.04	186.3	143.5

This table shows that dolichocephalic series of skulls differ from brachycephalic series by increasing the length and decreasing the breadth, but that the proportional increase of length is always greater than the decrease of breadth, and when the total averages for the 456 available long and the 30 short skulls are worked out

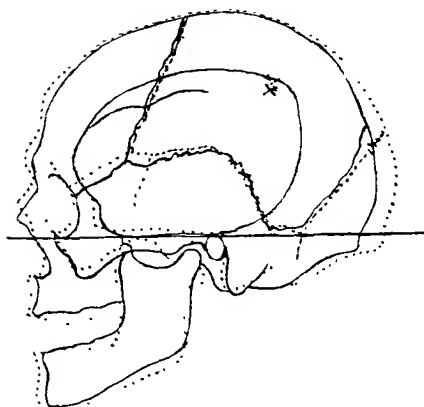


FIG. 5.—CONTOUR OF 30 BRACHYCEPHALS (CONTINUOUS LINE) SUPERIMPOSED ON THAT OF 27 ANGLO-SAXONS (ALL ♂).

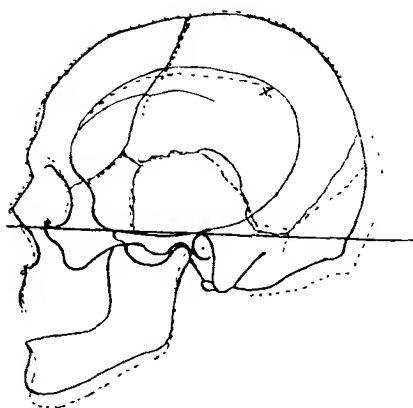


FIG. 6.—CONTOURS OF 30 BRACHYCEPHALS (CONTINUOUS LINE) AND 30 18TH CENTURY LONDONERS (DOTTED LINE)—ALL ♂.

there is an increase in length of 5.47 per cent. and a decrease in breadth of 4.0 per cent.

EXAMINATION OF THE SKULLS.

On looking at the profile views of these skulls (Fig. 1), one notices, as Toldt has done already (*loc. cit.*), that some of them, such as Nos. 1, 3, 11 and 18,

have rounded occiputs, as the dolichocephals have, while others, and those the greater number, have a flattening of the occipital region. Whether he is justified in regarding this as a racial distinction would require many more skulls than I have to determine, but one point which seems to recur frequently is that the flattening is often confined to the parietal bone, while the occipital bulges freely below the lambda. This is the case in Nos. 2, 6, 14, 20, 24, 26 and 29, and the result in a well-marked instance, such as 29, is that the parietal contour of the skull, instead of forming an even curve, has quite an angle above the level of the parietal eminence and brings that eminence much closer to the hind end of the skull, although it still remains just above the middle of the parietal bone.

This apparent shifting back of the parietal eminence has been noticed by Rolleston and many other observers in brachycephalic skulls, though it cannot be considered a crucial test because it is by no means always present, and it may occasionally be seen in the very dolichocephalic Long Barrow skulls, as in the one from Winterbourne Monkton (*Jour. Roy. Anthropol. Inst.*, vol. li, p. 59). The figures (Figs. 5 and 6) in which the composite contours of the brachycephals are superimposed upon those of the Saxons and 18th century Londoners shows exactly what has happened.

One cannot help being struck by the variation in the frontal region in these short-headed people. Sometimes, as in Nos. 6, 9, 13, 21, 22, 25, 27, 28 and 30, the frontal eminences are well developed and the fore part of the skull well filled, but in others, *e.g.* Nos. 1, 5, 7, 8, 10, 11, 14, 16 and 20, the forehead recedes and the frontal eminences are either suppressed or far behind the plane of the supra-ciliary region.

It is interesting to notice how prognathous many of these skulls are, much more so than is shown in the series of Long Barrow and Modern English (*op. cit.*, pp. 59 and 60). Nos. 2, 8, 11, 18, 24, 27 and 30 are good examples and seem to belong chiefly to Tolldt's Slavic rather than to his Alpine group.

It is evident that, from this lateral point of view, it would be very difficult to distinguish a brachy- from a dolichocephal, in spite of what is sometimes written about the skulls having a different contour, apart from the ratio of their length and breadth. Sometimes it may be done when there is marked flattening of the post parietal region, as in Nos. 2, 6, 14 and 29, but there is nothing, I think, to suggest that the cranial index of No. 28 is over 88, or of No. 16, 84.

When the average brachycephalic contour is superimposed upon that of a series of Nordic dolichocephals, as is done in Figs. 5, 6 and 7, the fact which at once strikes us as common to all of them is that the anterior parts of the long and short skulls coincide wonderfully well, but that in all of them the increase in length is in the occipital region, and that the short contour would in each case have assumed the shape of the long one if more active growth had gone on in the lambdoid and, perhaps, in the posterior part of the sagittal suture.

That this is not altogether a racial point may be shown by superimposing an average contour of Long Barrow skulls, which are believed to be of the Mediterranean race, on the short Alpine contour (Fig. 8), when exactly the same characteristic is seen.

There is very little difference, common to them all, in the position of the bregma, pterion, or coronal suture, but all the long skulls agree in the backward bulge of the post parietal and occipital regions, and in the dropping of the conceptacula cerebelli, and in these respects differ from the short skulls.

Again, in each superimposition, except perhaps that of the Long Barrow skulls, the lower jaw is larger and the chin is lower in the long skulls than it is in the short.

These are points to which I only wish to call attention in passing now.

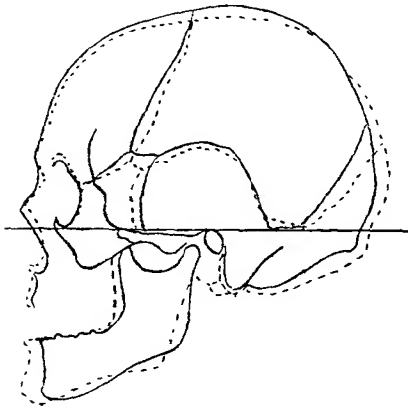


FIG. 7.—CONTOURS OF 30 BRACHYCEPHALS (CONTINUOUS LINE), AND 17 SWEDISH VIKINGS (IRON AGE) (DOTTED LINE)—ALL ♂.

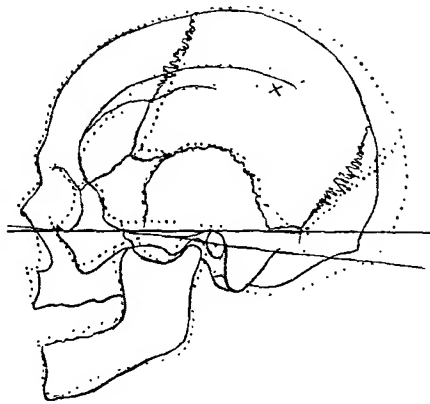


FIG. 8.—CONTOURS OF 30 BRACHYCEPHALS (CONTINUOUS LINE), AND 20 LONG BARROW SKULLS (DOTTED LINE)—ALL ♂.

The alveolar prognathism, so noticeable in many of the individual brachycephalic contours, does not appear in the composite drawing, having, no doubt, been counterbalanced by the orthognathism of the rest.

Lastly, the parietal eminence in the Anglo-Saxons coincides with that of the brachycephals, and so it does, as I should have expected, in the 18th century Londoners; but in the Long Barrow people it is a good deal farther back.

In the Swedish Vikings (Fig. 7) the contours were taken from Retzius' *Crania Suecica*, and the position of the eminence could not be determined in his photographs.

NORMA VERTICALIS.

Looked at from above the skulls have a general pentagonal appearance, the anterior margin being a line with an even convexity forward, contrasting rather

forcibly with the Nordic types, in which there is a central prominent convexity with a slight concavity on each side of it (see Fig. 9). The antero-lateral margins extend from the points C. z , z , in Fig. 4, where the zygomatic arch first appears, which corresponds approximately, though not exactly, with the external angular process, to the point of maximal width of the skull (I, z , z), which is 0·604 of the skull length from the front to the back. This distance is, as might be expected, a larger fraction of the total length of the skull than it is in a dolichocephalic series; in the 18th century London skulls, for instance, it is 0·596 of the length.

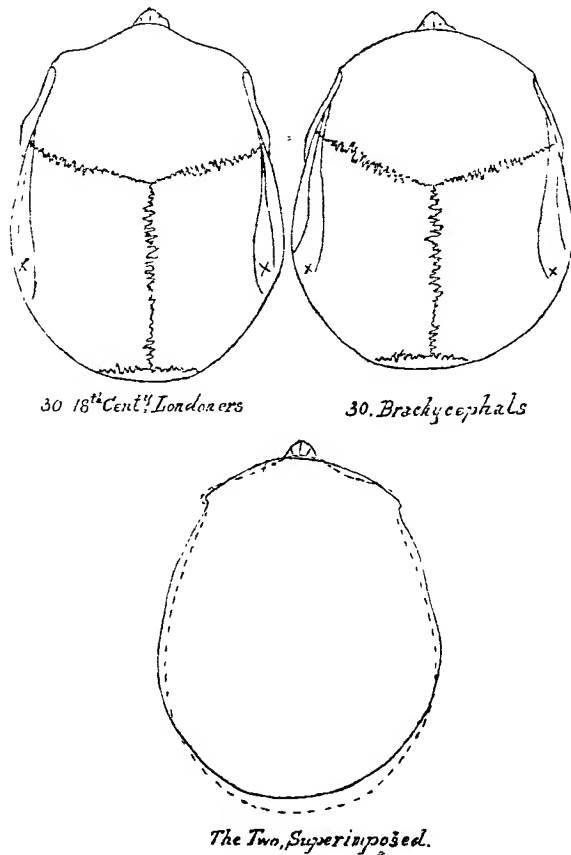


FIG. 9.—NORMA VERTICALIS OF DOLICHOCEPHALIC AND BRACHYCEPHALIC SKULLS COMPARED.

On comparing the brachycephalic with the London contours (Fig. 9), it is noticeable how much more convex these antero-lateral sides of the pentagon are in the short skulls than in the long, and how much less of the zygomatic arch is seen. Apparently cryptozygy, when tested by orthogonal apparatus, is not normal either in the short or long European skull, though, when tested as Owen and Huxley used to do, by looking at the skull from above, the question of whether it were crypto- or phaenozygous often depended on how far they held it from their eyes.

Of the thirty skulls under consideration, eight, or about 27 per cent., are crypto-zygous, while in the combined London (Clare Market) and Anglo-Saxon series (fifty-six skulls in all), only four, or 7·2 per cent., failed to show the zygomata from above. I admit that this is only an approximately fair comparison, because the series of skulls about which I am writing contains nothing but brachycephals, while the London and Saxon series are only dolichocephals on the average and may contain a few brachycephals.

The point which I specially want to emphasize is that in the brachycephals the antero-lateral region, where the temporal muscle is attached, is very full and wide compared with the dolichocephals, and the point of maximal width of the skull does not give a fair idea of the general increase of breadth of these skulls, since so much of it is in front of this point.

The postero-lateral margins of the pentagon are, of course, not so long as in the dolichocephals, and the posterior region of the skull, composed of the two

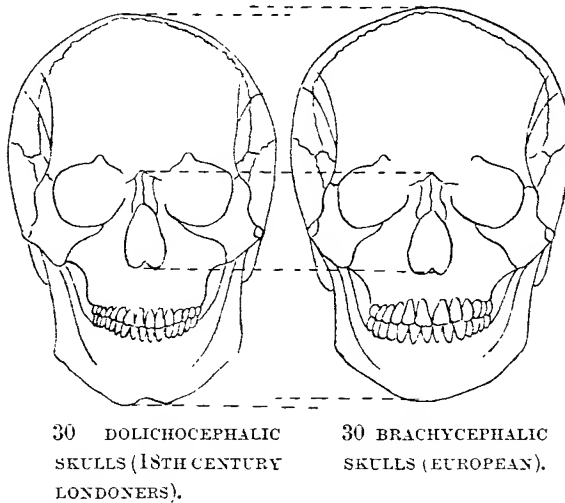


FIG. 10.

together, forms almost the segment of a circle, instead of being prolonged into an egg-shaped figure, as it is in the long skulls.

The lambda is about the same distance from the posterior end of the skull in the long and short series, so that the real loss of length in the latter takes place between the point of maximal width and the lambda.

The parietal eminences are always situated behind the point of maximal width, and are usually just above the point at which the lower temporal crest, with the temporal muscle attached, turns downwards.

NORMA FACIALIS.

When the average contour of the face view of these thirty brachycephals is contrasted with that of a dolichocephalic series, such as the thirty Clare Market

18th century skulls, a good deal of difference in the proportions of the various regions is apparent.

These two series will be useful ones to compare, because the total facial height from the vertex to the chin is the same in both and it may be divided up conveniently into three regions: (1) The forehead (vertex to nasion); (2) the nose (nasion to nasal point); (3) the jaws (nasal point to chin).

The proportions are as follows:—

					30 Brachycephals.		30 Dolichocephals (Clare Market).	
					mm.	Per cent.	mm.	Per cent.
Forehead	...	...	...	...	89	42·6	84	40·2
Nose	...	...	...	...	50	23·9	51	24·4
Jaws	...	...	...	...	70	33·5	74	35·4

From which we learn that the brachycephals had $2\frac{1}{2}$ per cent. more forehead-height and 2 per cent. less jaw-height than the Londoners.

With regard to the nasal width of 24·5 mm., these brachycephals have an actually wider nose than any of my groups of dolichocephals, all of which (*i.e.* London, Saxon and Long Barrow) are 23 mm., and, since the face is shorter, the nasal index of 490 is probably unreasonably high. I think that we mask the evidence which structures like the nose and orbits can give by expressing it in the form of an index, unless we are careful to get something like a constant for comparison.

Defenders of the old-fashioned indices say that the nasal index means nothing more than the relation of the breadth to the height of a particular nasal aperture, and does not commit the recorder to any statement as to whether the nose is specially broad or specially low. Theoretically this is perfectly true, but practically everybody knows that the height is more or less unconsciously used as a constant, and that a nose with a very high index is assumed to be a very broad nose when all the time it may be of normal breadth but particularly low. And yet, on the other hand, it must be admitted that a large face would have normally a proportionally large nose, and that this should be taken into account.

It seems to me that if we want a nasal or orbital index which will tell us whether the opening is proportionally wider or higher than the average we should use the total width and height of the face as a constant. The result, of course, will not be ideal and will still be open to criticism, but it will be of some real value which, in my opinion, the present indices are not.

I should like to make it clear that I am speaking now more of the facial indices than the cranial index which, though it is just as unscientific in conception, has turned out practically a very useful rough-and-ready guide to craniologists, since the coefficient of correlation is a negative one, and when a skull is broader than the average it is generally shorter.

This is not the case, according to my statistics, with the orbital measurements, where, in a large series, I have found that the coefficient of correlation between the height and width is positive, so that orbits higher than the average are usually broader, and we learn less by consulting the present orbital index than we should have done by taking the actual height or width alone.

If I have succeeded in making my meaning clear I shall, I think, have the reader's approval in expressing the nasal width of this series of skulls by the following formula :—

$$\text{Nasal width index} = \text{Na. W.} + \frac{\text{Vertico-Mental ht.} \div \text{Bizyg. W.}}{2}$$

$$\text{Na. W. Index} = 24.5 + \frac{209 \div 133}{2} = 0.143.$$

On comparing this with series of long skulls we get :—

Clare Market (18th century) series of 30 skulls	..	..	138
Anglo-Saxon series of 24 skulls	..	..	135
Long Barrow series of 20 skulls	..	..	134.5

This comparison shows that, when allowance has been made for the size of the face, the brachycephalic series has a much wider nasal aperture than any of the long skull series, and the index is a much more satisfactory one than if we take the nasal height as a constant. This will be seen from the following comparison :—

—	Actual Nasal Breadth.	Na. Br. and Face Size Index.	Na. Br. Na. Ht. Index.
30 Brachycephals ...	24.5	144	490
30 Clare Market ...	23	138	451
24 Anglo-Saxons ...	23	135	480
20 Long Barrow ...	23	134.5	460

The orbital aperture is, I think, of considerable racial importance both as regards width and height, but these must be kept separate and not intermixed in the old-fashioned orbital index, or much of their value will be lost. One of the characteristics of Nordic skulls is the frequency of high orbital openings, while in the Long Barrow and, I think, in the Mediterranean race generally, they are very low. It is therefore of some little interest to find out how they stand in European brachycephals.

The average actual height of the orbits is 32.5, the Saxons and 18th century Londoners standing at 34 and the Long Barrow skulls at 31.

The range of variation, when one glances at column 10 in the *Norma Facialis* Table (Table III), seems considerable and is represented by the coefficients of variation of 6.9, a very high figure.

This range is not surprising when one thinks how much the Mid-Europeans must have mixed with Nordic people on their Northern borders and with Mediterranean people on the South.

Personally I should be quite content to take the average actual height of the orbit as a guide, but it may be well to check it, as was done with the nasal width, by contrasting it with the total face area as follows :—

$$\text{Orbital Ht. Index} = \text{Orb. Ht.} \div \frac{\text{Vertico-Mental Ht.} + \text{Bizyg. Width.}}{2}$$

$$\text{O.H. Index} = 32.5 \div \frac{209 + 133}{2} = 0.184.$$

The comparison with other series, similarly corrected, is as follows :—

London (18th century)	..	..	..	..	..	204
Anglo-Saxon	..	..	..	..	..	200
Long Barrow	..	..	..	..	..	181

On looking over the results of these different views of the brachycephalic skull one cannot help being struck by the fact that it differs from the dolichocephalic chiefly in the greater width of the temporal and in shortening of the occipital region. Also that, on the whole, the jaws, particularly the lower, are less massive.

SUMMARY.

The material at my disposal seems to suggest the following conclusions :—

(1) That the brachycephalic skull is both shorter and broader than the dolichocephalic, but that its decrease in length is greater than its increase in breadth.

(2) That the dolichocephalic skull is longer by increased growth in its posterior part.

(3) That the brachycephalic skull is wider chiefly by growth in its temporal regions.

(4) That short European skulls are usually more prognathous than long ones.

(5) That when the nasal width is compared with the whole area of the face, brachycephalic skulls are distinctly broader-nosed than dolichocephalic are.

(6) That when the orbital height is compared with the whole area of the face the orbital openings are not so high in the brachycephalic as in the Nordic skull.

By the advice of some of my colleagues, I have carefully refrained from discussing the possible causes of any of these changes. Should the records be verified and become accepted facts, I shall be equally glad if they strengthen or weaken any existing theory.

TABLE I.—NORMA LATERALIS.

Brachycephals.	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.	L.	M.	N.	O.	P.	Q.	R.	S.	T.	U.	V.	W.	X.	Y.	Z.	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.	ab.	ac.	ad.	ae.	af.	ag.	ah.	ai.	aj.	ak.	al.	am.	an.	ao.	ap.	aq.	ar.	as.	at.	au.	av.	aw.	ax.	ay.	az.	ba.	bb.	bc.	bd.	be.	bf.	bg.	bh.	bi.	bj.	bk.	bl.	bm.	bn.	bo.	bp.	bq.	br.	bs.	bt.	bu.	bv.	bw.	bx.	by.	bz.	ca.	cb.	cc.	cd.	ce.	cf.	cg.	ch.	ci.	cj.	ck.	cl.	cm.	cn.	co.	cp.	cq.	cr.	cs.	ct.	cu.	cv.	cw.	cx.	cy.	cz.	da.	db.	dc.	dd.	de.	df.	dg.	dh.	di.	dj.	dk.	dl.	dm.	dn.	do.	dp.	dq.	dr.	ds.	dt.	du.	dv.	dw.	dx.	dy.	dz.	ea.	eb.	ec.	ed.	ee.	ef.	eg.	eh.	ei.	ej.	ek.	el.	em.	en.	eo.	ep.	eq.	er.	es.	et.	eu.	ev.	ew.	ex.	ey.	ez.	fa.	fb.	fc.	fd.	fe.	ff.	fg.	fh.	fi.	fj.	fk.	fl.	fm.	fn.	fo.	fp.	fq.	fr.	fs.	ft.	fu.	fv.	fw.	fx.	fy.	fz.	ga.	gb.	gc.	gd.	ge.	gf.	gg.	gh.	gi.	gj.	gk.	gl.	gm.	gn.	go.	gp.	gq.	gr.	gs.	gt.	gu.	gv.	gw.	gx.	gy.	gz.	ha.	hb.	hc.	hd.	he.	hf.	hg.	hh.	hi.	hj.	hk.	hl.	hm.	hn.	ho.	hp.	hq.	hr.	hs.	ht.	hu.	hv.	hw.	hx.	hy.	hz.	ia.	ib.	ic.	id.	ie.	if.	ig.	ih.	ii.	ij.	ik.	il.	im.	in.	io.	ip.	iq.	ir.	is.	it.	iu.	iv.	iw.	ix.	iy.	iz.	ja.	jb.	jc.	jd.	je.	jf.	ig.	ih.	ii.	ij.	ik.	il.	im.	in.	io.	ip.	iq.	ir.	is.	it.	iu.	iv.	iw.	ix.	iy.	iz.	ka.	kb.	kc.	kd.	ke.	kf.	kg.	kh.	ki.	kj.	kl.	km.	kn.	ko.	kp.	kq.	kr.	ks.	kt.	ku.	kv.	kw.	kx.	ky.	kz.	la.	lb.	lc.	ld.	le.	lf.	lg.	lh.	li.	lj.	lk.	ll.	lm.	ln.	lo.	lp.	lq.	lr.	ls.	lt.	lu.	lv.	lw.	lx.	ly.	lz.	ma.	mb.	mc.	md.	me.	mf.	mg.	mh.	mi.	mj.	mk.	ml.	mn.	mo.	mp.	mq.	mr.	ms.	mt.	mu.	mv.	mw.	mx.	my.	mz.	na.	nb.	nc.	nd.	ne.	nf.	ng.	nh.	ni.	nj.	nk.	nl.	nm.	nn.	no.	np.	nq.	nr.	ns.	nt.	nu.	nv.	nw.	nx.	ny.	nz.	oa.	ob.	oc.	od.	oe.	of.	og.	oh.	oi.	oj.	ok.	ol.	om.	on.	oo.	op.	oq.	or.	os.	ot.	ou.	ov.	ow.	ox.	oy.	oz.	pa.	pb.	pc.	pd.	pe.	pf.	pg.	ph.	pi.	pj.	pk.	pl.	pm.	pn.	po.	pp.	pq.	pr.	ps.	pt.	pu.	pv.	pw.	px.	py.	pz.	qa.	qb.	qc.	qd.	qe.	qf.	qg.	qh.	qi.	qj.	qk.	ql.	qm.	qn.	qo.	qp.	qq.	qr.	qs.	qt.	qu.	qv.	qw.	qx.	qy.	qz.	ra.	rb.	rc.	rd.	re.	rf.	rg.	rh.	ri.	rj.	rk.	rl.	rm.	rn.	ro.	rp.	rq.	rr.	rs.	rt.	ru.	rv.	rw.	rx.	ry.	rz.	sa.	sb.	sc.	sd.	se.	sf.	sg.	sh.	si.	sj.	sk.	sl.	sm.	sn.	so.	sp.	sq.	sr.	ss.	st.	su.	sv.	sw.	sx.	sy.	sz.	ta.	tb.	tc.	td.	te.	tf.	tg.	th.	ti.	tj.	tk.	tl.	tm.	tn.	to.	tp.	tq.	tr.	ts.	tt.	tu.	tv.	tw.	tx.	ty.	tz.	ua.	ub.	uc.	ud.	ue.	uf.	ug.	uh.	ui.	uj.	uk.	ul.	um.	un.	uo.	up.	uq.	ur.	us.	ut.	uu.	uv.	uw.	ux.	uy.	uz.	va.	vb.	vc.	vd.	ve.	vf.	vg.	vh.	vi.	vj.	vk.	vl.	vm.	vn.	vo.	vp.	vq.	vr.	vs.	vt.	vu.	vv.	vw.	vx.	vy.	vz.	wa.	wb.	wc.	wd.	we.	wf.	wg.	wh.	wi.	wj.	wk.	wl.	wm.	wn.	wo.	wp.	wq.	wr.	ws.	wt.	wu.	wv.	ww.	wx.	wy.	wz.	xa.	xb.	xc.	xd.	xe.	xf.	xg.	xh.	xi.	xj.	xk.	xl.	xm.	xn.	xo.	xp.	xq.	xr.	xs.	xt.	xu.	xv.	xw.	xx.	xy.	xz.	ya.	yb.	yc.	yd.	ye.	yf.	yg.	yh.	yi.	yj.	yk.	yl.	ym.	yn.	yo.	yp.	yq.	yr.	ys.	yt.	yu.	yv.	yw.	yx.	yy.	yz.	za.	zb.	zc.	zd.	ze.	zf.	zg.	zh.	zi.	zj.	zk.
	Bregma.	30°.	Frontal Em.	Ophryon.	Glabella.	Nasion.	Nasal Tip.	Nasal Spine.	Upper Incisor.	Lower Incisor.	Chin.	Angle Jaw.	Condyle.	Mastoid Tip.	Opisthion.	Inion.	Occipital Point.	Lambda.	340	360°	Upper Orbit.	Ext. Ang. Pr.	Lt. Obut. Att.	Ant. Pterion.	Postr. Pterion.	Staphanion.	Temp Crest	Squama	Squama Mastoid. Angle.	Asinion.	Basion	Pat. Em.	Post. Ratios	Low. Mele. Post.	Post. P.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
	A.	D.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	D.	A.	D.	D.	A.	D.	A.	D.	D.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D																																																																																																																																																												

TABLE II.—30 EUROPEAN BRACHYCEPHALS.—N. VERTICALIS.

Reference Letters to Figure ...	AZ	AB		AC		AD		E	AF			AG	H	AI		J	K	AL		M	N
	—	aa		ca		aa		aa	aa			33	—	aa	aa	aa		—	aa	33	aa
	Maxl. Length.	Halt way to Extl. Angr. Process.		Extl. Angr. Process.		Least Frontal Breadth.		$\frac{1}{4}$	Maxl. Bizyg. Width.	Do. Skull Width.	Bregma.	$\frac{1}{2}$	Maxl. Width.	$\frac{3}{4}$	$\frac{5}{8}$	Lambda.	Do.	Inter-stephanic.	Inter-eminential.		
	A.P.	A.P.	Tr.	A.P.	Tr.	A.P.	Tr.	Tr.	A.P.	Tr.	Tr.	A.P.	Tr.	A.P.	Tr.	Tr.	Tr.	A.P.	Tr.	Tr.	Tr.
1. Pole ... (R.C.S. 402) ...	184	8	62	17	98	20	87	115	62	137	122	82	146	108	149	131	100	176	62	118	135
2. Magyar... (R.C.S. 415) ...	169	9	64	19	104	21	96	114	49	130	121	66	140	106	145	133	103	160	70	116	123
3. Alpine 1 ... (S.Thos.Hosp.)	181	10	68	21	106	24	96	122	56	138	128	82	151	109	154	144	105	177	54	130	122
4. Alpine 2 ... (S.Thos.Hosp.)	171	10	64	21	98	26	94	115	58	127	127	72	140	101	142	128	96	168	54	124	118
5. German soldier ...	181	12	78	23	113	27	108	127	56	143	133	73	158	106	161	150	113	172	83	128	126
6. Croat ... (R.C.S. 407) ...	187	14	90	28	117	17	104	139	59	138	148	77	174	103	175	154	113	180	73	142	160
7. Pole ... (R.C.S. 401) ...	176	10	69	20	107	23	92	107	58	134	116	66	134	102	143	130	100	166	66	108	126
8. Magyar... (R.C.S. 411) ...	183	12	78	24	106	26	100	117	61	126	129	77	144	104	146	137	110	178	56	118	130
9. Croat ... (R.C.S. 408) ...	174	10	80	21	101	22	98	121	56	134	136	73	149	108	152	137	104	167	65	124	134
10. Hythe ... (S.Thos.Hosp.)	172	10	57	20	98	23	86	109	54	124	118	67	134	99	140	131	102	168	55	—	—
11. Slovak ... (R.C.S. 414) ...	176	11	66	23	104	27	94	116	60	134	124	70	140	100	144	130	96	170	46	114	120
12. Galician ... (R.C.S. 415) ...	178	13	80	26	106	28	103	122	63	124	132	80	145	104	147	136	105	176	46	126	123
13. Transylvanian (R.C.S. 413) ...	176	10	77	20	103	23	96	118	55	126	126	71	140	110	142	130	98	170	53	118	130
14. Finn ... (R.C.S. 463) ...	185	11	72	22	106	23	98	119	56	142	128	80	146	112	151	140	110	178	60	124	125
15. Roumanian ... (R.C.S. 427) ...	182	15	76	30	116	30	102	118	60	140	127	74	140	114	148	138	106	178	57	124	136
16. Transylvanian Saxon (R.C.S. 549) ...	175	9	73	18	94	23	94	117	52	132	126	72	145	107	147	134	104	166	68	124	130
17. Roumanian ... (R.C.S. 425) ...	174	10	72	20	102	24	98	120	57	126	128	84	142	106	144	130	102	172	52	122	126
18. Armenian ... (R.C.S. 459-3) ...	179	11	78	23	108	28	102	117	60	132	128	99	140	110	145	136	112	176	56	121	124
19. Roumanian ... (R.C.S. 426) ...	182	13	82	26	105	30	98	118	59	136	128	84	146	112	152	138	100	180	52	122	138
20. Serb ... (R.C.S. 547) ...	170	11	73	22	104	26	98	111	56	135	118	70	138	102	142	128	93	164	72	116	124
21. Neapolitan ... (R.C.S. 423) ...	170	9	71	18	102	22	92	114	58	140	124	70	138	108	144	133	108	166	64	119	121
22. Wend ... (R.C.S. 549-2) ...	176	10	71	20	106	22	103	122	54	132	128	76	140	112	142	127	96	170	60	123	126
23. Turkish ... (R.C.S. 549-6) ...	162	9	66	18	98	22	92	104	52	123	110	68	126	100	134	126	98	155	54	107	130
24. Chertsey ... (R.C.S. 354-1) ...	180	10	90	20	110	24	102	120	—	—	—	66	148	116	150	136	110	170	72	124	128
25. Prussian ... (R.C.S. 385) ...	180	9	76	18	102	21	95	118	56	133	126	80	145	108	147	130	100	170	70	122	131
26. Prussian ... (R.C.S. 388) ...	186	10	68	20	100	24	94	114	64	136	129	79	148	108	150	137	102	180	54	—	—
27. Swiss ... (R.C.S. 395) ...	184	12	88	25	111	30	105	124	51	136	128	79	147	106	148	130	100	178	59	127	134
28. Prussian ... (R.C.S. 384) ...	179	10	81	19	99	20	100	128	50	134	142	70	156	106	158	136	102	168	74	130	—
29. Prussian ... (R.C.S. 391) ...	180	12	84	24	109	27	100	117	58	134	127	84	140	120	145	134	104	176	56	120	128
30. Lapp ... (R.C.S. 458) ...	178	9	89	18	106	22	98	118	50	134	120	76	146	112	150	139	104	169	68	122	135
Average of 30 ...	178	10.5	75	21	101.5	24	97.5	118	56.5	133	127	75.6	144	107.5	148	135	103	171.5	61	122	129

TABLE III.—NORMA FACIALIS OF 30 BRACHYCEPHALIC SKULLS.

A.		B.		C.	D.	E.	F.	G.	H.	H'.	I.		J.	K.	L.	M.		N.		O.		P.	Q.	R.	S.	T.	U.	V.		X.	Y.																
αα		αα		αα		αα		αα		—	αα		ββ	αα		αα		αα		ββ	αα		ββ	—		—		αα		αα		αα		αα	—												
Supra Orbital.		Least Frontal Breadth.		20 mm. above Nasion.		40 mm. above Nasion.		60 mm. above Nasion.		70 mm. above Nasion.		80 mm. above Nasion.		90 mm. above Nasion.		Vertex.		Extl. Angr. Process.		Skull W. at do.		Intl. Angr. Process.		Nasal Tip.		Infra Orbital Line.		Maxl. Nasal Width.		Binaxial and Binastoid Widths.		Bilateral and Binastoid Widths.		Nasal Spine.		Incisor Pt.		Angle of Mandible.		Chin.		Mid point between Chin and Angle.		Orbital Height.		Maxl. Skull Width.*	
V.	Tr.	V.	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	V.	V.	Tr.	Tr.	V.	Tr.	V.	V.	Tr.	V.	Tr.	Tr.	V.	Tr.	Tr.	V.	V.	V.	V.	Tr.	V.	V.	Tr.	V.	Tr.	V.	Tr.	V.	Tr.	V.	V.							
1	11	42	19	87	146	140	110	84	48	— 8	86	0	94	147	7	16	24	24	137	40	24	46	97	116	60	60	—	48	66	—	—	—	—	—	—	—	—	32	7								
2	6	42	13	96	144	116	112	88	48	—12	84	6	92	138	12	20	16	26	130	37	24	44	94	117	60	62	100	48	60	76	82	96	109	109	26	95	77	31	6								
3	8	51	15	96	154	151	130	111	72	— 4	88	2	98	148	10	20	16	28	138	40	23	48	95	130	62	64	110	48	68	83	86	110	115	115	30	100	80	36	20								
4	6	46	12	94	141	135	118	101	72	— 0	90	3	92	140	8	20	10	27	127	36	26	42	80	118	60	57	99	44	62	78	84	91	108	109	26	96	58	32	6								
5	5	48	12	108	154	150	130	106	74	— 6	87	8	104	158	14	26	17	32	143	43	27	48	101	143	62	62	109	53	62	77	96	98	108	111	40	104	68	34.5	0								
6	4	50	15	104	173	171	151	135	106	— 60	96	6	102	168	17	28	18	33	138	38	25	54	92	130	67	61	—	51	70	—	—	—	—	—	—	—	—	35	15								
7	8	44	26	92	143	140	128	111	89	— 42	96	0	94	140	8	18	20	22	134	38	26	42	91	121	62	58	106	48	66	82	81	110	116	116	0	99	72	29	20								
8	8	48	18	100	146	143	120	98	60	— 0	90	2	102	144	9	25	14	28	126	39	25	46	90	114	62	68	96	49	70	83	86	100	116	118	28	102	80	53	28								
9	7	43	16	98	153	149	136	123	97	— 56	96	3	97	149	11	26	25	26	134	42	30	48	103	128	62	65	113	52	64	81	89	99	106	109	30	99	70	33	20								
10	11	47	22	86	139	137	127	110	83	— 42	93	0	89	136	5	21	15	26	124	37	22	45	93	114	62	66	—	48	68	—	—	—	—	—	—	—	—	31	14								
11	6	44	21	94	144	138	115	89	44	— 12	84	4	97	141	10	22	19	26	134	43	26	50	93	119	59	60	102	46	63	83	81	106	112	114	28	97	68	31.5	21								
12	4	54	8	103	147	143	124	107	80	— 33	93	6	98	141	13	21	19	30	124	43	21	53	94	119	71	59	96	53	73	85	98	94	120	121	36	110	72	32.5	20								
13	7	42	14	96	141	138	120	101	72	— 0	90	4	93	137	10	16	16	28	126	40	21	45	80	116	62	64	100	49	66	84	90	96	111	111	0	100	66	34	14								
14	8	45	26	97	150	147	134	122	96	— 62	97	0	100	148	8	20	21	22	142	46	22	39	98	126	61	67	—	53	71	—	—	—	—	—	—	—	—	30.5	20								
15	4	52	14	102	147	146	122	98	72	— 0	90	9	102	142	14	23	18	34	140	42	26	56	100	120	68	58	101	48	71	88	96	98	120	120	24	108	68	35	28								
16	7	43	12	94	146	138	117	95	59	— 72	86	6	91	143	12	19	22	32	132	46	21	52	85	116	70	58	102	55	75	92	94	104	126	126	24	110	69	34	11								
17	6	42	9	98	143	134	110	85	50	— 64	86	5	96	140	14	21	20	30	126	42	25	48	88	124	66	50	101	52	70	93	102	96	126	126	6	114	74	35	18								
18	8	50	20	102	144	138	108	70	— 48	— 98	77	6	98	140	14	20	16	32	132	44	26	53	89	118	72	63	102	56	77	95	98	101	132	132	6	115	68	38	16								
19	7	46	16	98	148	141	118	98	76	— 0	90	5	98	152	12	21	18	30	136	44	24	50	94	122	68	60	108	53	74	90	94	103	128	128	4	111	74	32	— 4								
20	6	50	15	97	138	130	105	81	48	— 38	86	6	96	139	12	20	11	30	135	38	24	47	90	124	62	54	—	48	62	—	—	—	—	—	—	—	—	34	6								
21	6	46	21	91	142	138	118	98	70	— 40	88	3	98	142	10	22	24	26	138	38	24	47	104	124	68	64	102	49	70	84	96	100	120	122	28	106	74	33	10								
22	6	51	9	103	139	129	98	73	— 0	— 73	89	5	100	140	12	20	23	28	132	45	22	55	87	122	60	60	100	53	66	81	91	100	118	118	24	104	70	33.5	4								
23	4	50	14	92	134	120	106	81	24	— 68	81	6	94	130	13	20	22	30	123	43	28	46	89	118	64	62	99	50	64	86	88	98	118	118	20	103	79	32	18								
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25	4	47	19	95	146	140	112	88	52	— 52	85	3	96	145	11	22	16	26	133	41	26	49	92	113	64	66	100	52	68	84	84	98	116	116	24	100	76	30	8								
26	8	48	11	96	149	144	130	113	84	— 34	94	0	94	147	10	23	15	27	136	39	26	46	91	118	62	52	—	49	67	—	—	—	—	—	—	—	33	8									
27	6	48	15	105	149	145	125	100	68	— 0	90	4	102	145	10	24	12	26	136	37	24	48	94	120	60	70	105	44	63	82	90	100	116	116	36	103	73	31	12								
28	5	50	11	100	158	150	136	122	102	— 70	99	5	99	148	12	20	14	27	134	41	21	48	95	124	64	70	99	51	72	88	79	96	118	118	36	98	80	29	20								
29	10	54	21	102	144	143	126	108	78	— 54	88	0	101	144	10	22	15	26	134	45	24	52	96	124	69	72	104	52	78	91	105	103	130	130	20	118	80	33.5	— 5								
30	7	49	19	98	148	145	129	106	81	— 48	96	1	92	144	8	16	15	24	134	38	25	42	89	118	59	60	101	48	64	80	87	102	112	112	24	100	77	27	7								
Av. ...	7	47	16	97.5	146.5	140.5	121	100	64	— 5.2	89	4	97	144	11	21	17.5	28	133	41	24.5	48	93	122	63.5	62	102.5	50	68	88.5	90	100	117.5	118	22.5	104	72.5	32.5	12.3								

* Only the vertical position of this measurement is given. The actual measurements are recorded under Norma Verticalis (A.I. $\alpha\alpha$).

THE WEEK IN WEST AFRICA.

By NORTHCOTE W. THOMAS, M.A.

IN discussions as to the transmission of items of mental or material culture it is generally recognized that some features will pass from people to people only under exceptional circumstances, while others are exchanged with comparative readiness. Among the latter are weights and measures, elements of the calendar, and, generally speaking, anything which is apt to enter into the relations between one people and another. Where two weights or two measures of length agree absolutely or very closely, it is difficult or impossible, unless they are based on some natural unit accessible to both peoples, to assert the independence of two such units, however remote be the areas in which they are used.

Where, however, the simpler features of the calendar are in question, the field of choice is more restricted and it cannot be regarded as axiomatic that a week of a given length, wherever found, must have spread from a single centre. If, for example, we find a five-day week in Central America, Java, the north of Europe, and West Africa, we cannot, without supporting evidence, assert their interdependence; if, on the other hand, we find the names of the days are identical, still more if they are in the same order, it is impossible to deny transmission.

The problem is, however, seldom presented in these simple forms: we find the same units of time in use in detached areas of a single cultural region, and both migration of peoples and transmission of culture elements are possible factors. On the other hand, we find the names of the days in contiguous areas are either wholly different or only a small proportion of the total number agree. Here it is vastly more probable that the unit has been borrowed and most of the names invented to suit local circumstances; but it is impossible to exclude independent adoption of the same unit in two or more discontinuous areas, which have, by transmission to their neighbours, ultimately become one.

In general works on the calendar, and still more, in proportion, in special works on primitive time-reckoning or on rest days, data from West Africa are conspicuous by their fragmentary character, if not by their complete absence. Yet the appendix to the present paper shows how much has already been recorded; and the Nigerian material suggests that there is yet much to be collected in other areas.

It might appear a simple matter to define the term "week" so that it would be impossible to confuse it with any other unit; but unless we import into the matter

questions of origin or function, the only possible form of words appears to be: "a calendar unit, composed of a varying number of days and shorter than a month." But this definition suffers from two defects: firstly, it assumes that the month is an unmistakable unit of time, whereas there are, as I shall show below, periods of time which are not lunar months and can hardly, if they have no reference to the year, be termed calendar months: yet some at least correspond in the main to what we mean by a month: and secondly, there are a number of cases in which there is more than one unit of time in use to which the above definition will apply, such as the nineteen-day period of Ahanta¹ on the Gold Coast, which ran concurrently with the decad and with the week with named days. It is inconvenient to use the term week of all these units: and the decads,² in particular, seem to differ from the week in being in origin, at any rate among some tribes, sub-divisions of the lunar month, whereas the week is only under exceptional circumstances synchronous with the month³ and cannot, even in these cases, be shown to be derived from the lunar month.

To assume, on the other hand, that a week is always made up of *named* days, raises the difficulty that in some tribes the names of days are simply the cardinals or ordinals indicative of the serial place of the day in question. These are not names in the ordinary sense: even if they were, they would not offer an escape from the difficulty with regard to decads: for even if no cases are recorded in which decad days are so distinguished, nothing is more likely than that they are, at least at times, so named.

In cultural areas where the week is in use (and, as will be seen, commonly associated with the market), it will probably suffice to define the week as the smallest sub-division of the month greater than the day: but we cannot, without more information, regard as weeks the units of the Banhun,⁴ reported in the 16th century, the Wagirama,⁵ and other sporadic cases.

With fragmentary data it is impossible to answer otherwise than provisionally all the questions which arise in connection with the week. It is quite certain that the data at my disposal are very incomplete, and even as regards the recorded data we need to know much more about the meanings of the names, their exact distribution, etc., before the problems they raise can be tackled in earnest.

The main questions for discussion are as follows: (1) What are the areas in which the different units are in use and how are they related to culture, language and similar areas? (2) What were the motives—economic, religious or mixed—which led to the adoption of a unit shorter than the month? (3) On what basis

¹ 3, 137: 19, 78.

² See also 58, 1856, 249: 19, 111: 20, 107.

³ 51, XI, 302, and below.

⁴ 33, 92.

⁵ 19, 111.

was this unit selected, and what relation, if any, did it bear to the month? (4) What was the origin and meaning of the day-names? (5) What is the name of the week, and what does it mean? (6) What is the nature of the rest day and how is it related to the week and the market, etc.? (7) How is the week related to other sub-divisions of the month and similar calendar units? In connection with more than one of these questions will arise the problem of transmission versus independent origin, which may well, with the scanty material at our disposal, prove insoluble.

It is a fairly safe guess that the day, measured by the sun, was the first calendar unit, and that it was very much later, possibly with the closer observation of the seasons demanded by agriculture, before there came into use the solar year, which we use to this day. But as the Indo-European names of the month attest, there was also an age in which the moon was pre-eminently the measurer of time, and there are traces of a lunar year, adjusted to the solar by intercalary months or other calendrical devices. There is no such necessary relation between the week and heavenly bodies, though of course both the names and the order of the days may be dictated by astronomical or astrological considerations.

It has, however, sometimes been argued that because the week can by the exercise of a little ingenuity be shown to be a sub-division, from an abstract point of view, of a month, it was therefore in the first instance derived from the month. Roscher, for example, lays down that weeks of five, seven, eight, nine or ten days must be derived from the month, and supports his thesis by pointing out the existence of various sorts of months—a sidereal month of nearly $27\frac{1}{2}$ days, a "light" month of about 28 days, a lunar month of about $29\frac{1}{2}$ days.¹ By taking the appropriate length of month it is possible to show that not only the kinds of weeks enumerated above, but also three, four, and six-day weeks are derived from the month. All that is required is a sufficient number of months of varying length with sufficient laxity in applying the idea of factoriality, and it is not difficult to show that any week from one up to fifteen days has been derived from the month, for all the numbers between 1 and 10 are factors of 27, 28 or 30.

The data are however erroneous, and, even were it otherwise, they do not prove what Roscher deduces from them. In the first place, it is clear that the "light" month, reckoned from the appearance of the crescent moon to its disappearance at the end of the lunation, is not, for practical purposes, a month at all, for the "dark" days must be added. Ellis, it is true, tells us that the Twi have a twenty-eight-day month, which he calls "lunar," but he also tells us that it is reckoned from new moon to new moon. Now the sidereal month is nearly 27 days 8 hours and the lunar month is 2 days 5 hours longer (in round numbers): if, as appears to be the case, the Twi month is from new moon to new moon, as with all other West African tribes, it is wholly inaccurate to speak of a twenty-eight-day month: the expression seems to be due to Ellis's theory that the periodic week was necessarily derived from

¹ 47. XXI, XXIV.

the month. So far as Africa is concerned, there is no convincing evidence of the existence of a month either of twenty-eight days or of twenty-seven and a fraction.

But unless it can be shown that a month of a given length was in use, or, at the very least, known in a given area, it is idle to point to the arithmetical relation between the week actually in use and one of the months known to scientific men in Europe. That the week in a given area is of a length that will divide, even exactly, into the number of days in a month of another area proves nothing; it may mean that the week has been borrowed or that another length of month was formerly known in the area where the week is in use; but it may equally well be pure coincidence.

If it is true that both Twi and Yoruba have periodic weeks, made to synchronize with the lunar month, it would be hardly possible to select two tribes in West Africa on whose calendar we can place less reliance in discussing origins, for the Twi have non-negro features in their phonology,¹ which suggests a strong foreign element: and the Yoruba area supplies unmistakable evidence of Egyptian influence² in the remote past, added to which we have the very non-negro character of the Yoruba pantheon with its crowd of deities, grouped in part in families. One author of the last century indeed records from one part of the Yoruba country a year of 360 days, *i.e.* twelve months of thirty days, with five epagomenal days to adjust the reckoning of the year.³ If this information is reliable it is remarkable that this unique feature, so far as West Africa is concerned, should be found where the week has only four days; for northern and southern Yoruba differ in the length of the week.

The author in question also tells us of other features almost or wholly unknown elsewhere in West Africa—a three days' fast at the New Year, a moon festival in the sixth month, Oçu,⁴ and a special festival on the last day of each month, which was observed as a rest day. Our confidence in these highly interesting facts is somewhat shaken when we find that in recording the names of the days of the week he gives "to-day," "to-morrow," etc., as weekdays.

It is unfortunate that the whole subject of the "periodic" weeks of the Twi and Yoruba is enveloped in mystery; for Ellis tells us that the first day of the first week of the lunar month of the Twi commences at sunset; it is therefore not a solar day at all and in each week the day begins at a different time, for the last day of the first five weeks is nine hours longer than the other four days. Our reliance on this account is not increased when we find that Ellis says some weeks may have eight days and only six nights.⁵

¹ 65, X, 243.

² 20, *passim*.

³ 57, II, ii, 81.

⁴ But *cf.* 31, 235; 29, 82.

⁵ 17, 216.

If it is correct that the first week in the month always begins at sunset, it is clear that the second will begin at 3 a.m., the third at mid-day, and the fourth at 9 p.m. If we take "night" to mean the hours from sunset to dawn, and day the remainder of the twenty-four hours, and take fractions of a twelve-hour period, we find the weeks contain 7 "days" — $7\frac{3}{4}$ "nights"; $7\frac{1}{2}$ "days" — $7\frac{1}{4}$ "nights" (twice); and 7 "days" + $7\frac{3}{4}$ "nights." Taking fractions as whole numbers, we have two weeks with eight "days" and eight "nights" and two with seven "days" and eight "nights."

It is therefore clear that Ellis's statement is wholly erroneous. As long as day and night succeed each other nothing can make any period contain more than one "night" (or one "day") more than any other. Even if we take "night" in a forced sense, and call the period of darkness two "nights," one ending at midnight, the other at 6 a.m., we can only get two periods with nine "nights" and seven "days," *i.e.* the first and fourth weeks, but no corresponding periods in which the "days" exceed the "nights" by two. It is clear, therefore, that Ellis is wholly mistaken; he may well have had no personal experience of the calendar he describes. Were it otherwise, he could hardly assure us that (*a*) the first day of the first week commences at sunset, when the new moon is ordinarily first perceived, and (*b*) that the Twi have a week of seven days and about nine hours. It is perfectly clear that with this arrangement, the next month will be due to commence, not at sunset, but towards sunrise: if it commences at sunset, the month contains either 29 or 30 days, not $29\frac{1}{2}$. Unless therefore the calendar is adjusted, the week and month cease to synchronize; if the first three weeks are 7 days 9 hours in length, the fourth must be alternately three hours less than 7 days 21 hours longer, *i.e.* practically a whole day. This could hardly happen without attracting attention, even if there were no name given to the intercalary day: but Ellis makes no mention of any such adjustment and does not even perceive the need for it.

The inaccuracy of the whole account is further demonstrated by the fact that Ellis says of the Twi that they have thirteen lunar months (of $29\frac{1}{2}$ days) in their year, which runs from May to April¹; but thirteen months of that length make a year of over 383 days: this would mean that the New Year was making the round of the calendar in twenty years, but of this Ellis has not a word to say.

Difficulties of the same order meet us in Ellis's account of the Yoruba calendar.² for his statement that the day commences at sunset is made with special application to them. But it has been shown above that the statement is incompatible with a month of $29\frac{1}{2}$ days. Their year is said to begin in October,³ and we have seen that a fixed beginning of the year is impossible if the reckoning is by lunar months, as is asserted of the Yoruba also.

¹ 18, 213.

² 17, 145, 147, etc.

³ 17, 150.

I have not touched upon the enormous practical difficulties that would arise from the anomalous beginning of the week: but it is obvious that rest days and still more, market days would be brought into confusion if the civil day varied in length and did not always correspond with the solar day. Still greater confusion would be imported if there were any attempt at synchronizing lunar month and solar year.

It has been pointed out above that Ellis's account implies an intercalary day in alternate months. I need hardly point out that if intercalary days were invented, a far simpler solution of the week-month problem would be given by making the week a seven-day one and adding alternately one and two intercalary days to the month. By taking two years of twelve and one of thirteen months in a cycle, the error in the year would be reduced to a little over a day.

The original purpose of this digression was to show that the twenty-eight-day month attributed by Ellis to the Twi is in reality a creation of his own imagination: and this has been abundantly demonstrated. The case of the Wa-Giriana, to whom the "light" month has also been attributed, is on all fours; for they reckon the period when the moon is invisible as epagomenal days.¹ It appears therefore that there is in use in Africa only one sort of month computed by the moon, and that is the periodic month which depends on the phases. Unless otherwise stated, month is used in this sense in the present paper.

Generally speaking this month is not based on the numbering of days, but on the reappearance of the moon. There are, however, a number of periods in use to which we often apply the name of month, inappropriate as it is, for want of a better term. To avoid confusion I speak of such a period as a "mense," and include under the term any unit greater than a decad and less than a year, but not forming a fractional part of a year.

Among the units of this order are the great Adae (forty or forty-two days) and little Adae (eighteen or twenty days) of the Twi²: a thirty-six-day period (with a six-day week), probably in Nkonya,³ Togoland: a thirty-day mense (eight to the "year") in Ibie. Kukuruku: a twenty-three-day mense among the Ewe⁴; a twenty-day Mense at Soso (fifteen to the "year"); at Iyede, Sobo country, nine of the same length went to the "year," obviously a half-year. Ahanta, on the Gold Coast, had a nineteen-day mense,⁵ possibly related to the Adae, as well as decads, and a perhaps borrowed week; Semolika, Kukuruku, has nineteen months in the year, which must be of nineteen or perhaps twenty days each. A twenty-day

¹ The same is probably true of Mandingo (41, II, 39) and Wolof (6, 357).

² 18, 216.

³ 54, XXXVIII, 458.

⁴ 53, XXIX, 36.

⁵ 3, 18.

mense, perhaps a derivative of the week, is reported from Abeokuta, but remains unconfirmed.¹

The fact is that neither year, month, nor mense plays an important part in native life: they have little or no relation to agricultural operations, and cult is often regulated by a wholly different scheme. If the native is questioned, it is difficult to get from him more than the vague answer: "When we see the new moon come out, we know that another month has begun." Even where, as among the Ibo, seven weeks, twenty-eight days, played an important part in magico-religious ritual, and the great markets (*eza*) on the banks of the Niger near Asaba, were held at the same interval, there was apparently no association of moon or month in their minds when they spoke of seven *izu*.

Of the Ewe, Westermann says that they have no division into months: this must, however, be understood in a modified sense, for in his dictionary he gives "month" as well as "moon" as a rendering for *uki*.

In Edo (Benin City) the same state of things prevailed. There were priests of the sun and moon (*Iwoki*), and tradition assigns a considerable antiquity to the site where they carried out their duties. But in spite of this, the reckoning of the year was in the hands of the king's "day reckoners," old women of the household, selected perhaps because of their familiarity with cowry counting. They distinguished "male" and "female" years, the shorter being, as I gathered, 340 days in length: this would give nearly twelve months of twenty-eight days, nearly thirteen of twenty-six, but can hardly be made to fit in with a twenty-nine or thirty-day month. If the month was a lunar period of $29\frac{1}{2}$ days, two short and three long years would differ only by about four days from the true length of five solar years.

I failed to ascertain the length in days of the longer year,² partly because the women had forgotten much of their lore, as it seemed, partly because the enquiry was painfully lengthy, as my knowledge of the multiplication table was tested each occasion it was displayed, by interminable reckonings with cowries, which were counted and recounted.

Bosman³ gives as the length of the Edo year fourteen months, but gives neither the length of the year nor of the month in days: we are clearly not entitled to assume that no European knowledge crept into their calendar. If their "male" year had fourteen months and 365 days, thirteen months of the same length would give the "female" year plus one day, but this would leave unexplained the need for the existence of the shorter year.

I need hardly point out that the mere fact of the difficulty of ascertaining the length of the year from the "day reckoners" is conclusive proof that the year was

¹ 10, 205.

² Cf. 36, 311.

³ 7, 426.

of little importance. That the reckoning was not in the hands of the *Iwoki* is, of course, presumptive in favour of a non-lunar month.

It seems probable that there was a lunar month also, not perhaps precisely in use, but recognized by the people, for at the present day *uki* means both moon and month, as among the Ewe. But the really important ritual calendar took no account of either mense or month. From Chief Ihama and others who played important parts in the royal household. I obtained the ceremonial calendar of the Edo. The first date given was near the spring equinox, but I failed to discover whether the two were connected.

Period.	Name and Ritual.
March 18–April 8	<i>Isure</i> .
April 9–29	<i>Ehaora</i> (? worship of head).
April 30–May 14 (?)	<i>Ukoviozuele</i> (= moon of the son of Ozuele).
May 15–July 31	<i>Oro</i> , which included :—
June 1–15	<i>Egute</i> .
August	<i>Ehedo</i> .
September, October, November (?)	<i>Ugigu</i> .
November	<i>Igwe</i> .
December	<i>Agwe</i> .
January–February	<i>Ehiezu</i> (worship of head).
February–March	<i>Agwesa, Igwogane</i> .

In this calendar are two periods of over sixty days,¹ four of over thirty, and five of fifteen or twenty days, the latter mainly in the wet season ; there is therefore no trace of either week or month. As regards the week, it may be noted here that it differs completely from that of the Ewe in respect of the names, which are the same in Edo as in Ibo, though in a different order ; even the four-day period of Edo is found only in a part of the Ewe area, although the Ewe country was under Edo till the 17th century or later.

The way has now been cleared for a discussion of the points relating to the week which have been enumerated above. I give in an appendix a classified list of weeks according to the length of the unit, giving the names of the days, where they are known, with, in some cases, the meanings of the names, together with the tribes or localities in which they are in use. Where no authority is quoted the facts are taken from my own records.

I.—AREAS.

(a) There is some doubt as to the two-day Bafuen market in Kamerun, and it does not necessarily indicate that a week is recognized. In any case, the facts seem of small importance.

¹ The Ewe reckon three main seasons, *adame* (March–June), *keleme* (July–October) including *masa* (September–October), and *pepi* (November–February). See 36, 312.

(b) There is good authority for the three-day Añlo week, reported by first-rate witnesses like Spieth and Westermann as well as by older writers like Bosman. Moreover, in a neighbouring four-day area an examination of the names shows that a three-day week must have been the original one: for the third day, *asitogbe*, means "beginning of the market": in the four-day week this is followed by *asinyagbe*, preparing the market—obviously an interpolation.

(c) We have no real information as to the extent of the four-day Congo area:

(i) but it is clear that at least one of the Loango names is found among the Bakamba, Bambala, Bayaka, and Bacugni. The Bakamba and Bayaka have Nkoyo in common and Pika is shared by Bambala and Bakamba. On the whole it seems probable that these and other partial identities to be noticed later are due to the fact that the week spread with, if it did not originate in, the market. Where a weekless tribe visited one market of a neighbouring tribe that had evolved a week, the familiar name of the market day would be supplemented by other names of local origin. (ii) The Giriama week in East Africa appears to be an independent unit unconnected with the market. (iii) The four-day week of the Lower Niger extends from the Cross River, or perhaps even Kamerun, across the Ibo and Edo country through South Yoruba to Dahomey. (iv) Sporadic four-day weeks are found in Kong, Brignan, and Liberia. (v) On the south and east of the Ibo area the names are more or less aberrant.

(d) In the case of the five-day week, we seem to have two or more independent areas: (i) on the Cross River (Agala, Wakande, Ezzi, etc.), (ii) in the north of the Yoruba country, with (iii) an outlying area in the south-west of Togoland, which may at one time have been continuous with it; (iv) in the Kyama area, 300 miles further west. (v) It is not clear if the Zumper and Tikar units are weeks in the ordinary sense.

(e) The six-day area likewise throws its borders widespread over the map, and here lack of information prevents us from saying whether or not the areas are continuous. (i) This week is found in Togoland, where so many linguistic islets maintain a precarious existence to witness to the composite character of the population: (ii) 500 miles north-east it occurs among the Kentu, north of the Benue, and the Jukun; (iii) far to the west Wintz records it among the Diola, but the character of the period is not clear.

(f) The seven-day week (i) with indigenous names is recorded from Dahomey, three points in Togoland, the Twi and Ga (enlarged from a four-day week), and Baule: (ii) the Wolof have a seven-day week with five Arabic and two native names; (iii) a seven-day week is also found in Kordofan: (iv) Barth recorded a seven- or eight-day period among the Kanuri; (v) in the Lagoons area a seven-day period has also been noted.

(g) (i) For the Kwa, Goldie records a nine-day period, but the information is far from clear and it should perhaps be regarded as an eight-day unit, and (ii) Strub

records an eight-day unit among the Kukuruku, with doubled Ibo names, the second half being all rest days.

II.—FUNCTION OF THE WEEK.

A theory was put forward by Col. Ellis, that the week was the creation of the rest day, which was itself a transformed lunar festival,¹ but his view was based on the exceptional facts of the Yoruba-Twi area, and there, as has been shown, his information seems to have been seriously at fault. There is no real evidence to connect their rest-days—still less the week—with a moon festival. It is true that one day of the Ga week bears a name which means "moon," but it may be a homophone; and in any case the Ga week has in all probability been enlarged from four days. Moon festivals are in point of fact rather rare: the Bechuana have one according to Livingstone, and one is recorded also for the Baetke. But isolated facts like these are a slender prop for such a theory: and it is a long step to make the rest day the origin of the week, even if the lunar origin of the rest day be made probable.

There is much more to be said for a religious but non-lunar origin of the rest-day: in fact there can be little doubt that in the greater part of West Africa the rest-day is a tabu period, entailing abstinence from the regular work, especially that of cultivating the fields, and devoted to the worship of the local gods, or some of them. Only in the Congo do we find a utilitarian origin ascribed to it: Bentley explains the rest day as intended to increase the attendance at the local market.² But this may well be a late rationalistic interpretation of the facts, and in any case it is hard to see why men should abstain from work when almost everywhere the market is predominantly, if not entirely, the woman's sphere. On the coast of Guinea not only is the market distinct from the rest day,³ but the religious character of the latter is expressly vouched for in a number of cases.⁴ Whether in the latter instances the market is held on the same day does not appear from the authorities. But in the Edo area the cases in which the market falls on the rest day appear to be only slightly more numerous than those in which it does not. This may indeed go to show that the distribution is not due to chance, but it hardly proves more.

It is somewhat singular that Ellis asserts that among the Yoruba the market is never held on the general rest day: but we do not know on how large a collection of data this generalization is based. It is not unimportant to observe that for all practical purposes the rest day is incumbent on men only, so far as our authorities and my own observations go. On the Gold Coast it is the fisherman's rest day⁵ that has most often been recorded, and it appears that all other work is permitted:

¹ 17, 147.

² 5, 399.

³ 34, VI, 288; 48, LV, 121; 4, 255.

⁴ 63, VI, 418; 62, 1900, 114; 50, II, 201.

⁵ 9, 54; 35, 215; 24, 81.

it is not clear whether a general rest day exists. In an agricultural community work in the fields is forbidden, but other work is permitted, and the experienced traveller chooses that day for obtaining carriers. One authority says that on the rest day the Serer¹ prepares wares for sale, but work in the fields would be punished, presumably by an angry deity, by the burning of their houses.

If the week originated in the rest day and its ritual prohibitions, we ought to find a predominantly religious atmosphere about the week: it ought to be possible to show that the ritual prohibitions are found in areas where a week is in use, but no market—and the rest day should bear an invariable relation to the week, *i.e.* there should be only one general tabu day each week. But, except in the Yoruba-Twi area, the week is primarily economic in its atmosphere, as many of the day names and a few of the week names show: there is some evidence that the Giriama have a non-market week dependent on a rest day, but as the latter bears an Arabic name it is not illegitimate to suspect that the institution also is of foreign origin. As to the third point, it is sufficient to say that at least two cases are known² in which two rest days (general) are observed in the week, while the Kukuruku have in the first half of the week a holy day which does not seem to be a rest day, and the second half is entirely made up of rest days. Here at least the week and the rest day seem to be wholly unrelated.

It may of course be urged that some towns have two markets and that this tells against the economic origin of the week. But such cases are commonly due, (*a*) to the coalescence of two villages, (*b*) to the former existence of an extramural market for non-townsmen, (*c*) to the presence in the town of diverse elements, as at Edo, where the king's quarter is distinguished by a different method of roofing the houses, or (*d*) to the rise of the small daily market for purely local trade.

In discussing the function of the week it must not however be overlooked that there may be more than one centre of origin and more than one motive at work. At present the data are too fragmentary and the recorded facts too incomplete, *e.g.* as regards the meaning of the names, for any conclusions to be more than provisional. We need to know (*a*) the areas of distribution of week, rest day, and market, and definite statements for all tribes whether they have (i) all three, (ii) two out of three, (iii) only one, or (iv) none of these institutions. It will then be possible to work out the relation of the three at the present day. It is however possible that in spreading from tribe to tribe their character has been changed: they may also have spread independently, not as a complex, *i.e.* a tribe which had all three may have handed on only two to its neighbours for some reason. Some light may be shed on borrowing and changes of function by the names, and we need to know (*b*) the names of week, weekdays, rest day, and market, and of course the meaning

¹ 63, VI, 418.

² 49, XXIV, 473; 55, LXXXI, 382.

of the names. (c) Finally we need to know in far greater detail the ritual prohibitions of the rest day, their distribution, and on whom they are incumbent.

III.—UNIT OF LENGTH.

It may be taken as certain that each unit spread more or less widely from its place or places of origin: it is therefore only by good fortune that we are likely to hit upon the reason for which each unit was originally selected. If the market was the source from which the week originated, the length of the week would in the first instance be dictated by the number of places in the market round. At the present day women frequently in the four-day area sit in their own market one day and visit other markets on the other three. But unless tradition has handed down the sites of the original markets or the names of the days reveal them, it is unlikely that the point will ever be cleared up. It is however possible that where the original week has been lengthened, as among the Ga, there may be some tradition of the reasons which led to the change.

In considering the question of the origin of the different units it must be borne in mind that, apart from the purely local afternoon market attended only by women of the town itself, no market can at the present day set up without the co-operation and assent of neighbouring places. If a new market infringed ancient rights, it might cause a war: at the very least, certain places might boycott it, for the women are often under the control of a market queen, who can impose her will on them. But if at the outset, when markets were beginning to arise, it was already the practice to fix the day and place of markets by agreement between different towns, it is no long stretch of the imagination to suppose that, the order of the markets once fixed, by mutual agreement, the unit we now call a week came, as it were, automatically into existence, with appropriate names for the days.

If the rest day was the origin of the week, it is difficult to see why different towns, and still more different tribes, were led to adopt the same unit; there is no interdependence in cult matters, and no town could possibly have any interest in its neighbours' ritual regulations. If it were otherwise, we can hardly imagine that the unit would be fixed, while chance decided on what day the ritual prohibitions, the due observance of which was the motive which called the unit into existence, should be enforced in a given locality. It is clear that each town, or, at most, each tribe, decided on its rest day by reference to its local gods, which differ from place to place. But if the date of the recurrence of any given place's rest day was of no interest to its neighbours, it is singularly unconvincing to argue that wide areas agreed to make their rest days recur after the same number of days.

Until we know more of, firstly, the distribution of the various weeks and how far each unit occupies a closed area, and, secondly, if the scheme of distribution is to-day incoherent, how far migrations will account for it, there is little more to be said about the units. The four-day area of the Lower Niger appears to be

unconnected with the sporadic four-day weeks further west : but it is impossible not to suspect some relation with the four-day Congo area, though the day names are wholly different. The whole question however cannot well be discussed apart from questions of language and culture areas, and I merely mention in passing the possibility that light may ultimately come in this way as to the period at which the week originated.

IV.—THE DAY NAMES.

An examination of the names of the days shows that there are three kinds of names in use : (a) those derived from or referring to the market : (b) those derived from or referring to religion : and (c) a set of Kukuruku names which Father Strub declares to be of mythological import.

Now, on the one hand, these names are on the whole identical with those of adjacent towns : on the other hand, a certain number of these people, among them the inhabitants of Agenegbode, trace their origin to the Sobo who fled from the oppression of Edo. *Elewo* of the Kukuruku is found at Iyede among the Sobo in the form *Edewo*, but the other names are different. If *Edewo* was carried from the Sobo country and became part of the Kukuruku calendar, it is clear that its Kukuruku interpretation must be of the nature of an afterthought. That it is not a pure coincidence is rendered more probable by the fact that the day is the rest day of Iyede, and not only of Agenegbode, but of several other Kukuruku towns west of them, eight cases in all as against three of all the other days, precisely what we should expect if the Kukuruku calendar was originated by the Sobo immigrants. It is perhaps not without significance that Iyede also has a non-lunar month, several of which are also found in the Kukuruku country.

An examination of the lists makes it abundantly clear that individual names and also whole systems have been borrowed on a large scale. It is however not always possible to decide between transmission and chance coincidence. Semolika *Aro* at once suggests an Ibo loan : but it seems to be related to the *Ewo* series. One of the most puzzling features of the lists is the identity of the Ibo and Edo names with changed order. The Edo of Benin alone have these names : they are not in use either among the Ewe or in the less remote areas of the kingdom of Edo. But the Ibo have been the imitators of Edo as regards the names of officials, and some of their rulers were confirmed in their office by the king of Benin. It is therefore more probable that if the Ibo did not borrow from Benin, both Edo and Ibo derived the names from another source.

Some light will be thrown on the question when we know something of the laws of phonetic changes in the two languages. It seems fairly clear that *Afɔ* is the original form and *Ahɔ* the modified form. If it were certain that *Nkwɔ* were the original form, and not a later nasalized one, the same would be true of *Nkwɔ-Okwɔ*, but we do not know that the nasalization which is so frequent in Ibo is not a secondary phenomenon, connected possibly with the decay of prefixes.

But there is an *f-h* interchange within the Ibo group, for *ofu*, or *ovu* appear also in the form *ohu*: and there is also at times a dropped nasal as in *ghu*, *muu*. On the other hand there are some indications that *f-h* is a normal Ibo-Edo relation, for we find *ofufe*, *eho*. At present, therefore, we cannot expect to get any light on the matter from purely philological considerations.

Some of the Ibo names, *Eke* and *Nkwo*, are found in the four-day Cross River area, both among Ibo and non-Ibo-speaking tribes: whereas, if we turn to the five-day tribes, the Ibo Nbo have *Okwo*, and the Ibo Ezzi have *Nkwoda*. There seems to be little doubt that the Ibo language was imposed on the present Ibo-speaking tribes by an influence which came from the north-east: but the facts just cited suggest that the week, or, at any rate, the day, names were not brought with the language. That they share with the Ibo the word for market may be no more than an indication that the market spread from the Ibo proper to the two rather aberrant tribes in question, as well as to the non-Ibo peoples.

There has clearly been a certain amount of borrowing of names in the Togoland area, where *klu* and similar forms are found in the day names of Likpe, Adele, Sautrokofi, etc.

TABLE I.—COMPARATIVE LIST.

<i>Edo.</i>	<i>Ibo.</i>	<i>Okpoto.</i>	<i>Asiga.</i>	<i>Semolika.</i>	<i>Abini.</i>	<i>Ogoni.</i>	<i>Lyede.</i>	<i>Ibe.</i>
<u>Eke</u>	<u>Eke</u>	<u>Eke</u>	<u>Eke</u>	Avo	<u>Eke</u>	Deko	Edewo	Ewo
Aho	Oyi	Ori	Aboko	Ekui	Ebum	Dem	Edimu	Ekbe
Orie	Afo	Okwo	Nkw	Iviena	Ikp	Dejie	Uze ...	Evia
Okwo	Nkw	Avo	Ile	Anumo	Ibubele	Debon	Okikacuewo	Elume
1	1	1	1	2 (?)	1	—	<i>f</i>	<i>f</i> (?)
2	3	3	—	<i>a</i>	—	<i>d</i>	<i>d</i>	<i>a</i> (? 4)
3	2	4	4	<i>b</i>	4	<i>e</i>	<i>e</i>	<i>b</i>
4	4	2	2	<i>c</i>	—	—	—	<i>c</i>

V.—THE NAME OF THE WEEK.

The name of the week is recorded but rarely: I recorded a certain number of names in the four-day area, but unfortunately none from the adjoining five-day tribes. Ellis, Westermann, Strub and Goldie give the names for Yoruba, Guang, Kukuruku and Elik, but these are the only data I have found. In the weeks numbered 10, 12, 27, 41, 43, as well as in Edo and Agbede, the name of the week means "five days," in accordance with the usual principle of counting the first day

of the new unit.¹ The name at Kokori means "nine days": and at Agenegbode a similar name is found, *utumò*, which seems to be a singular formed from *ìwì*, nine. The names *use*, *uze* are probably in like manner singulars of *ise*, five: the Sobo form is clearly derived from Edo, for the Sobo word for "five" is *inyoli*.

At Sapele, by a curious aberration, the name of the week means "four nights," a variation for which I can suggest no explanation unless Portuguese influence have something to do with it.

The interpretation suggested above for *use*, *uze* seems to be borne out by the custom of Ama in the E-sa country, where *uhekì* can only mean "five of the market," just as *edeki* (Edo), *adaki* (E-sa), mean "day of the market," and, in a transferred sense, "week": this transference of the name of the market to the week is also found among the Efik, who use *urua* for both.²

A different cycle of names is found at Eda, Semolika and Okpe, where a day name, in the first two cases that of the market day, is also used for week, if my informants rightly apprehended the question put to them.

For the Yoruba Ellis suggests that *ose* was originally used to mean "rest day" and took a secondary meaning "week," and that the root means "forbid." His lists of verbs do not confirm this derivation, and I do not find the verb in the dictionaries at my disposal. It is noteworthy that Dennett's citation of Johnson³ makes Ifa's day the first, while in Ellis's list it is second.

The Ibo name for week is *izu*, to which Zappa adds *uge* for the Agbor area. There does not appear to be any tradition as to the meaning of the word, and its widespread use suggests that the name must have been disseminated with those of the days.

Finally, there are the Guan names, *nk'ek'e*, *nkekue*, the latter of which is printed in the other part of the vocabulary as *nke kukue*, unless appearances are deceptive. The day names in use are Twi, probably borrowed: but the word for "day" in *ekè*, *kukue* means eight: the one form therefore means "eight days": the meaning of *nk'ek'e* is not clear, but *ek'e* is an alternative form of *ekè*. There is of course no ground for associating this word with the Ibo day name: at the same time it is impossible to say that no relationship is possible. Nkonya (84) is a Guan tribe, and their days have different names, one being *Dekè ike*: it is worthy of note that *ike* means in Ibo "rest," and though there is no reason to connect Ibo with the speech of Nkonya, there is no doubt of the kinship between Ibo and other Togoland languages, such as Avatime.

It is abundantly clear from these facts that Ellis's derivation of the week from the rest day is not borne out by the names of the week: with the possible exception

¹ This rule is not observed when nights are counted, as at Sapele: cf. 1, *ib.* 154; 20, I, 285.

² 21, *supra*.

³ 15, 243.

of Yoruba, every one of the translatable words either associates the week with the market or gives the number of days in the week.

It is moreover by no means impossible that Yoruba *use* is derived from *ise* or *uze*, for *Uze* is a Sobo day name, and *ujū uze* might become *uj ose*.

VI.—THE REST DAY.

There is too little exact information as to the nature of the prohibitions associated with the rest day for it to be possible to discuss it in detail at present. Ellis assures us that no important business is undertaken by the Yoruba¹ on that day; but whether markets are held on it is a matter of uncertainty. The Edo rest day fell on the day of Enyai market; in fact, each of the four days had its market. In the Congo the Bavili rest day for men is the woman's market day²; women have apparently a rest day two days later, but it is not clear whether they visit other markets.

Reference to the lists shows that rest day and market coincide in 4, 17, 19, 22, 23, 28, 30, 33, 34, 92, and 111, eleven cases in all; they are different in 9, 13, 14, 16, 20, 26, 29, 67, 101, nine in all: in the latter cases it is of course uncertain how far attendance at other markets is permitted. It is therefore quite clear that the market day has a certain tendency to fall on the rest day, for otherwise the proportion would be one to three. But until we know whether by rest day is meant a day for men only, for women only, or for both sexes, it is impossible to accept as proved Bentley's suggestion that in the Congo the rest day was instituted for the benefit of the market. For the Bavili this is decisively disproved by Dennett's evidence that women have another rest day (from agriculture). The woman's market can hardly fall on the man's rest day in order to increase the attendance, for men are idlers in the market. From Westermann's *Wörterbuch* it appears that the Ewe have two rest days in succession (*s.v.* *Asitoegbe*): but elsewhere under the words in question the rest days are given as *Awenogbe* and *Asigbe*: between them comes *Asiamigbe*, which seems to be the equivalent of *Asigbogbe*, but is declared in the text to be the same as *Awenogbe*. I cannot reconcile the data as they stand.

As to the general character of the rest day, it is associated with the worship of gods among the Twi, Yoruba, Efik, Akposo, and of the demi-gods among the Edo; but generally speaking it is on abstinence from field work that most stress is laid, and it is not necessary for such a ritual prohibition to be associated with any specific deity. It is worthy of note that at Edelu (13) and Sabongida (15) there is a day named after Osa, the chief Edo deity, which is not, in the former case, the rest day. Among the Twi, and possibly elsewhere, the worshippers of individual gods have their own rest days, so that, *e.g.* fishermen on the Gold Coast stay at home

¹ 17, 145.

² 15, 64.

on Tuesday, field workers on Friday¹; it is not clear whether there is a general rest day. Among the Bavili, field work is forbidden to women on a day when men do not rest.²

What would be of great importance as a document with regard to the rest day, a notice relating to the Ewe of Agu,³ loses much of its value, owing to the fact that the week to which it relates is a seven-day one and therefore derived from the Twi area. We cannot be sure that the indigenous rest days have not been added to the foreign ones when the new week was taken over.

This section of the Ewe have two rest days in seven: they are sacred to the "fetish," and on them no one may go to the fields and undertake work: markets are held on these days, and buying and selling are permitted, as well as household work; the days in question are Sunday and Wednesday. On two other days, Monday and Tuesday, certain areas in the farm land are forbidden on religious grounds. The remaining three days are full work days for the "Nyambo" people. From this it appears that the information really relates to the Nyangbo.

VII.—THE WEEK AND THE LUNAR CALENDAR.

It has already been shown above that Ellis's account of synchronization of the Twi and Yoruba months cannot be relied on. Until we have an account of the matter illustrated by examples from the actual calendar, it seems useless to discuss the origin of the concordance between week and month, and impossible to say whether it is a primary or a secondary feature.

There is of course no relation between week and decades nor between week and Adae, so far as is known. But there is a seventeen-day period in the Yoruba country,⁴ known as *eta-di-ngun* (three less than twenty), which is connected with the *esu* or subscription clubs, which, Ellis asserts, meet every fifth market day, *i.e.* every seventeen days. This is of course correct if it refers to the southern Yoruba, who have a four-day week; but in his account of the calendar he recognizes the five-day week only, and fails to observe the inconsistency.

The main conclusions to be drawn are: (1) That our knowledge is still too fragmentary to permit us to map out the areas in which the various units are in use; much less can we correlate them with other ethnographical units. (2) The week was a unit of economic origin. (3) It is not clear how the period was selected. (4) The day names often relate to the markets, less often to the gods worshipped on those days; but in many cases their meaning is not known. (5) The name of the week has not been recorded in all cases: it often denotes the number of days. (6) The rest day was religious in origin, and no clear relation exists between it and the week or the market. (7) The week is not related, save in exceptional cases, to other calendar units; this relation may be of secondary origin.

¹ 17, 149; 18, 220.
² 55, LXXX, 382.

³ 15, 64.
⁴ 17, 149.

TABLE II.—WEEKS AND DAY NAMES.

Translations in (); explanations in [].

I.—*Two-day (?) Week.*

1. Bafuen, Kamerun (25, 363).

II.—*Three-day Week.*

2. Anlo, Ewe, Togoland (40, 81).
 i. *Asigbe* (market).
 ii. *Atykyusi* (market in Atoko).
 iii. *Asitoegbe* (beginning of market).

III.—*Four-day Week.*

3. Anlo, Ewe (46, 81 : 41, 316 : 67, XXVI, 12, 110).

(a). (b).

- i. *Asigbe* (market). *Asigbe*.
 ii. *Asigbe uore egbe* *Asigboegbe*.

(second day).

- iii. *Etigbe* (third day). *Domegbe*.
 iv. *Asinyigbe* (day of *Asimloegbe*, preparing).

(asi = market.)

4. Ho, Togoland (36, 311 : 41, 316, 431).

- i. *Asiamigbe* [good luck].
 ii. *Awenogbe* [bad].
 iii. *Asitoegbe* [bad].
 iv. *Asigbe* (*Hosigbe*) or *Asime* (market : rest) [good luck].

5. Dahomey (30, 334).

- i. *Adogwin hi*.
 ii. *Zobodo hi* [good luck].
 iii. *Aja hi*.
 iv. *Mignon hi*.
 (ahi = market.)

6. South Yoruba.

- i. *Ojé Esu*.
 ii. .. *Orisula*.
 iii. .. *Oduduwa*.
 iv. .. *Jakuta*.

7. Tamberma, Togo hinterland (17, III, 335).

8. Kyilina. do. (52, XI, 142).

9. Edo, Benin City (
- cf.*
- 44).

- i. *Eke* [rest day : worship of *ebu* : Enyai market].
 ii. *Aho* [king's market].
 iii. *Orie* [go to bush market].
 iv. *Okoro* [farming day : market in Edo].
 (week = *use*.)

10. Ijeba, Ora tribe.

- i. *Eladeki*.
 ii. *Odudueki*.
 iii. *Ekehadueki*.
 iv. *Aluasuhe* [market].
 (week = *esuhe* : market = *eki*.)

11. Aroko, Kukuruku.

- i. *Eladeki*.
 ii. *Etukiki*.
 iii. *Etukioleme*.
 iv. *Eteki* (? market).

12. Sugbenu, Ora.

- i. *Edeleli*.
 ii. *Ivie*.
 iii. *Idak*.
 iv. *Nesdehe*.
 (week = *nheli*.)

13. Edelu, Ora.

- i. *Edilele* (third day : rest day).
 ii. *Uhile*, *Edeki* (market).
 iii. *Edeadele* or *Edohame* (= day between : day of Obame).
 iv. *Elosa* (Osa's day).

14. Ako, Ora.

- i. *Edele* (rest day).
 ii. *Edughonodion* (big farm day).
 iii. *Edughonadele* (farm day in middle).
 iv. *Edeki* (market day).

III.—*Four-day Week*—cont.

15. Sabongida, Ora.

- i. *Edekinile*.
- ii. *Edoise* [market].
- iii. *Edemenolomolo*.
- iv. *Edeguale*.

(week = *edoise*.)

18. Agenegbode, Kukuruku (50, XI, 400: MS. note).

- i. *Elewo* (day they laid them).
- ii. *Elekwi* (day they drove them away) [rest].
- iii. *Elevia* (day they bore them).
- iv. *Elumi* (day they forged them).

19. Fugar, Kukuruku (week = *ute*; eight-day week = *utumi*).

- i. *Elewo* [rest and market].
- ii. *Elekwi*.
- iii. *Elevia*.
- iv. *Elumi*.

(week = *elile*.)

20. Sebe, Kukuruku.

- i. *Eleg* [rest].
- ii. *Elekō*.
- iii. *Elemia* [market].
- iv. *Elemumi* [work].

21. Ibie, Kukuruku.

- i. *Ewo* [rest].
- ii. *Ekbe* [farm].
- iii. *Eria*.
- iv. *Elume*.

[eight thirty-day months.]

22. Soso, Kukuruku.

- i. *Ewo* [farm].
- ii. *Ekbe* [farm].
- iii. *Eria* [rest, market].
- iv. *Enu* [farm].

[fifteen months in year.]

23. Semolika, Kukuruku.

- i. (*Akuwo*) [rest, market].
- ii. *Akbe*.
- iii. *Triena*.
- iv. *Anamo*.

[week = *Akuro*; nineteen months in year.]

24. Okpe, Kukuruku.

- i. *Akwo*.
- ii. *Akekbe* [market].
- iii. *Akriene* [market].
- iv. *Akeluma*.

(week = *akwo*.)

16. Idlua, Ora.

- i. *Edisere* (rest day).
- ii. *Edugbonoewa* (big farm day).
- iii. *Edekingbara* (Agbara market).
- iv. *Awarale* (to-morrow rest day).

17. Eda, Ora.

- i. *Elisile* [market rest day].
- ii, iii, iv. *Elugbo* (farm day).

25. Uzaitui, Kukuruku.

- i. *Elew*.
- ii. *Elekwi*.
- iii. *Elemia*.
- iv. *Elumi*.

26. Wari, Kukuruku.

- i. *Elemio* [big day on farm].
- ii. *Elekwi*.
- iii. *Ebiki* (market).
- iv. *Elelumi* [rest].

27. Yaju, Kukuruku.

- i. *Elew*.
- ii. *Elekwi*.
- iii. *Elemia*.
- iv. *Elelumi*.

(week = *uzaj*.)

28. Woreki, Kukuruku.

- i. *Elew*.
- ii. *Elew* [rest, market].
- iii. *Elemia*.
- iv. *Elelumi*.

29. Afuje, Ora.

- i. *Elew* [market].
- ii. *Elekwi* [rest].
- iii. *Ekiomosi* (Omoisi market).
- iv. *Animaweki* (to-morrow market).

30. Ekbe, Ora.

- i. *Elek* [rest] (market).
- ii. *Elekwi* (yesterday market).
- iii. *Elemia* (two days ago market or *Elekpole*).
- iv. *Elemia* (to-morrow market or *Elekpelele*).

31. Uza, Ora.

- i. *Elaku* (market).
- ii. *Oleadu akamo* (yesterday market).
- iii. *Igbesa* (third day from market).
- iv. *Awadueki* (to-morrow market).

32. Otwa, Kukuruku.

- i. *Uqenue*.
- ii. *Uqenekwe*.
- iii. *Ugueleriena* [market].
- iv. *Uqelela*.

III.—*Four-day Week*—cont.

33. Ilegun, Esa.

- i. *Edaki* [rest] (market).
- ii. *Edugbowodi* (big farm day).
- iii. *Ewades* (middle day).
- iv. *Axadueki* (to-morrow market).

(week = *uheki*.)

35. Ugei, Sobo [double four].

- i. *Edeki* (market).
- ii. *Atu ekinokiriele*.
- iii. *Atu ekinoasiduru*.
- iv. *Edekiaka* [Edo = *Aka*] (Edo market).
- v. *Ekiebo*, *Adenoadekiaka*.
- vi. *Adekioteli*.
- vii. *Adeki uxwokoli*.
- viii. *Okiri ekiugbo*.
- ix. *Ekiebo*.

36. Okpara, Sobo [do.].

- i. *Edeki*.
- ii. *Atuekinu*.
- iii. *Edekiaka*.
- iv. *Okirieakiedewo*.
- v. *Edewo*.
- vi. *Aredewonu*.
- vii. *Edikikokosi*.
- viii. *Okiri atueki*.

37. Ovu, Sobo.

- i. *Edeki*.
- ii. *Atuekinu*.
- iii. *Edeoxilivie*.
- iv. *Okiriatu edeue*.
- v. *Edewo*.
- vi. *Atuedewonu*.
- vii. *Edekelero*.
- viii. *Okiri atueki*.

38. Sapele, Sobo.

- i. *Edeki* (market).
 - ii. *Atuekiokeriele* (day after market).
 - iii. *Edeluelarie* (two days after market).
 - iv. *Okiriatuski* (three days after market).
- (week = *asoene*, i.e., four nights.)

34. Ama, Esa.

- i. *Adaki* [rest] (market).
- ii. *Edenogolo*.
- iii. *Elenasisi*.
- iv. *Akiviera*.

39. Ewu, Sobo.

- i. *Edeki*.
- ii. *Akekiru*.
- iii. *Edule*.
- iv. *Okizatueki*.

40. Emosoga, Sobo.

- i. *Edeki*.
- ii. *Akwiki nokelele*.
- iii. *Edoxirie*.
- iv. *Okikawiki*.

41. Iyede, Sobo.

- i. *Edewo* [rest day].
- ii. *Edimu*.
- iii. *Uze*.
- iv. *Okikaxnewo*.

(week = *uze*; month = *amala*; nine of twenty days in each "season.")

42. Owu, Sobo.

- i. *Edewo*.
- ii. *Okiokele edekilogbo*.
- iii. *Uze*.
- iv. *Edekiaka*.

43. Kokori, Sobo [double four].

- i. *Edewo* [rest day].
- ii. *Atuedewonu*.
- iii. *Atueki adeneaka*.
- iv. *Atuene akantu*.
- v. *Edewo* [rest day].
- vi. *Edele*.
- vii. *Edeki*.
- viii. *Etugkinu*.

(week = *edirili*.)

44. Ibo (see 9).

- i. *Eke*.
- ii. *Oyi, Ori*.
- iii. *Afu*.
- iv. *Nkwu*.

45. Okpoto II.

- i. *Okwu*.
- ii. *Atu*.
- iii. *Eke*.
- iv. *Ori*.

(rest day = *ode*.)

46. Ezza, Ibo.

- i. *Nkwu*.
- ii. *Eke*.
- iii. *Orie*.
- iv. *Afu*.

47. Biko (Cross River), Ibo.

- i. *Nkwu*.
- ii. *Ekoyo*.
- iii. *Nkwekoyo*.
- iv. *Afogo*.

III.—*Four-day Week*—cont.

48. Asiga, Cross River.

i. *Nkwɔ*.ii. *Ile*.iii. *Eke*.iv. *Aboko*.

49. Ekpafia, Ibo.

i. *Ekwɔ*.ii. *Eke*.

49. Ekpafia, Ibo—cont.

iii. *Udie*.iv. *Izu*.

50. Okuzi, Ibo.

i. *Nkpo*.ii. *Eke*.iii. *Olie*.iv. *Afa*.

51. Abua.

i. *Ogudu*.ii. *Ake*.iii. *Amanubwe*.iv. *Amanamanubwe*.

52. Abini, Akunakuna.

i. *Ikpo*.ii. *Ibubele*.iii. *Eko*.iv. *Ebum*.

53. Ugep, Ekuri.

i. *Aiyokpobi*.ii. *Aiyokuke*.iii. *(O)kuke*.iv. *Okobleke*.54.¹

55. Akpet, Akunakuna.

i. *Anoi*.ii. *Ora egbe*.iii. *Ai ogbe*.iv. *Ovano*.

56. Ediba, Ekuri.

i. *Lebomo*.ii. *Ise*.iii. *Bikwo*.iv. *Etiep*.

57. Kana or Andoni.

i. *Oserenkpa*.ii. *La-ankpa*.iii. *Ndeja*.iv. *Ndile*.

58. Ebiobolo or Ogoni.

i. *Deko*.ii. .. *mg*.iii. .. *jie*.iv. .. *bon*.

59. Efik (21, 351).

i. *Ederi* (*aqua* and *ekpre*).ii. *Ibibio*iii. *Ikwo*iv. *Fign*

[This week is really a double four, the days being called "great" and "small."]

[Rest day is *ederi Abasi* or *aqua Ederi*.]

60. Kpelle, Liberia (43, 150).

[Four-day week: rest day, no market. On rest day abstinence from work is neither absolute nor universal.]

(week = *doku*.)

61. Brignan, Ivory Coast (49, XXXI, 105).

[Four-day week and market, also seven-day period.]

IV.—*Five-day Week*.

62. Arun, Cross River.

i. *Ebotowo*.ii. *Ekojiawo*.iii. *Egbenewo*.iv. *Ekoruwo*.v. *Edouwo*.

(market = *efiawo*.)

63. Wakande, Esopon.

i. *Ebangalewo*.ii. *Werekfewo*.

63. Wakande, Esopon—cont.

iii. *Egewo*.iv. *Itutuwo*.v. *Ekoruwo*.

(market = *efia*.)

64. Agala, Yala.

i. *Okonoma*.ii. *Uluu*.iii. *Egu*.iv. *Ebozu* [rest].v. *Orobozu*.

¹ No. 54 was accidentally omitted and the reference mislaid.

- IV.—*Five-day Week*—cont.
65. Ezi, Ibo.
- i. *Nkwoda* or *Abuga*.
 - ii. *Nkwaga*.
 - iii. *Ovoki*.
 - iv. *Azua*.
 - v. *Ibokun*.
-
66. N'ba, Ibo.
- i. *Okwa*.
 - ii. *Azokwa*.
 - iii. *Unnwa*.
 - iv. *Ekwu*.
 - v. *Omaka*.
-
67. Yoruba (17, 147).
- i. *Ako njo* [rest day for all].
 - ii. *Ojo Awo* [rest for worshippers of Ifa].
 - iii. *Ojo Ogun*
 - iv. *Ojo Šango*
 - v. *Ojo Obatala*
- (week = *Ose*.)
68. Ife, Yoruba.
- i. *Ojape*.
 - ii. *Ajebape*.
 - iii. *Iremo*.
 - iv. *Nikogun*.
 - v. *Ajeose* [? rest].
69. Yoruba (20, I, 285).
- i. *Ojo Ose* [rest].
 - ii. *Ojo Awo*.
 - iii. *Ojo Ogun*.
 - iv. *Ojo Jakuta*.
 - v. *Ojo Oseosala*.
-
70. Yoruba (15, 245).
- i. *Ojo Ifa*.
 - ii. *Ojo Abamefa*.
 - iii. *Ojo Yemaja*.
 - iv. *Ojo Jakuta*.
 - v. *Ojo Obatala* or *Owo*.
71. Jeba (57, II, n, 81).
- i. *En* (to-day).
 - ii. *Ola* (to-morrow).
 - iii. *Onula* (day after it).
 - iv. *Iperé*.
 - v. *Opoze*.
- [Johnson, 27, 348, says there is a nine-day market: the first three names are clearly due to a misconception.]
-
72. Borada, Togo.
- i. *Nime dro*.
 - ii. *Nime ni*.
 - iii. *Nime kpro*.
 - iv. *Dekplei*.
 - v. *Lui*.
- [1-3 seem to be numbered, but the numerals are not Borada.]
73. Akposo, Togo (50, II, 201; IV, 142).
- i. *Egla*.
 - ii. *Ewe* [rest; worship gods other than Uwolowo; work forbidden].
 - iii. *Imle*.
 - iv. *Ekpe*.
 - v. *Ewle* [sacred to Uwolowo].
-
74. Kebu, Togoland (50, IV, 422).
- i. *Dokod* [pl. *Etokoé*].
 - ii. *Yalabe* [*Eyulabe*].
 - iii. *Gigbeld* [*Ecigbeld*].
 - iv. *Dagid* [*Arogir*].
 - v. *Gadod* (rest) [*Ekuwir*].
75. Lezba or Kabere Sokode, Togoland (59, XIV, 257).
- i. *Musa*.
 - ii. *Kawza*.
 - iii. *Bodo*.
 - iv. *Poa*.
 - v. *Kizda* or *Kobda*.
-
76. Kyama, Lagoons (14, 24).
- i. *Abi*.
 - ii. *Abukpa*.
 - iii. *Aso*.
 - iv. *Apa*.
 - v. *Apo*.
77. Zumpu or Mbanke.
- i. *Kotsu nzo*.
 - ii. .. *ibwa*.
 - iii. .. *iba*.
 - iv. .. *nze*.
 - v. .. *itsou*.
- (The days are known by numbers: the period is said to refer to beer-making in this and the two following cases.)

IV.—*Five-day Week*—cont.

78. Tikar, Kamerun.

- i. *Gyiguan mbo*.
- ii. .. *mbi*.
- iii. .. *nle*.
- iv. .. *nyi*.
- v. .. *sti*.

[Numbered days.]

79. Ahlo, Togoland (44. 15).

- i. *Ke*.
- ii. *Iwui, Iwi*.
- iii. *Ikple*.

79. Ahlo, Togoland—cont.

- iv. *Idodi*.
- v. *Igokla*.

79A. Anexo, *ib.* (67. XXVI, 110).

- i. *Waga*.
- ii. *Ague*.
- iii. *Grilji*.
- iv. *Togo*.
- v. *Sewaga*.

[These are apparently place names, used as day names, and names of markets.]

V.—*Six-day Week*.

80. Tem or Kaure (61. XIV, 237).

- i. *Segbede*.
- ii. *Som*.
- iii. *Bare* or *Birini*.
- iv. *Kalsiga*.
- v. *Kodzugati*.
- vi. *Kolimaso*.

81. Camba, Togoland (59. XI, 128, 154).

- i. *Basa*.
- ii. *Bolagwa* or *Balagwa*.
- iii. *Kurugbwe*.
- iv. *Kobale*.
- v. *Lare*.
- vi. *Kuri*.

82. Basari, Togoland (59. XI, 104).

- i. *Kore* or *O're*.
- ii. *Betagba*.
- iii. *Banyu*.
- iv. *Kundja*.
- v. *Labo*.
- vi. *Kunkunde*.

83. *Id.* (59. XIV, 237).

- i. *Kwagya*.
- ii. *Kunkunde*.
- iii. *Bogbagwar*.
- iv. *Alahare* [? Arabic].
- v. *Labo*.
- vi. *Koukya*.

84. Nkonya (60. VIII, 121) [a Gha tribe].

- i. *Dekake* [? rest].
- ii. *Adeke trake*.
- iii. *Kelike*.

84. Nkonya—cont.

- iv. *Kelike dekeke*.
- v. *Adeke trake*.
- vi. *Ipué*.

85. Loro (20. III, 367).

86. Boro (60. VIII, 121 ; 61, 1922, iii).

- i. *Dokulu*.
- ii. *Dokutse*.
- iii. *Dokuli*.
- iv. *Dokpa*.
- v. *Doso*.
- vi. *Dowo*.

87. Santrokofi (61. XIV, 196).

- i. *Lepo*.
- ii. *Lepo kalese* (= dawn).
- iii. *Nyinke*.
- iv. *Dikru*.
- v. *Dikru kalese*.
- vi. *Nimulo* [Nimu is a god].

88. Lakpe (61, 1922, iii).

- i. *Lebo*.
- ii. *Koboso*.
- iii. *Deklu*.
- iv. *Kaklusa*.
- v. *Echiainu*.
- vi. *Dikouafe*.

89. Adele (61, 1922, Vocab. ; 59. XI, 104).

- i. *Dakpɛn*.
- ii. *Ditsori*.
- iii. *Dumori*.
- iv. *Dakpelawa*.
- v. *Difa nafe*.
- vi. *Difa krumatse*.

V.—*Six-day Week*—cont.

90. Avikam, Lagoons (14, 49).

- i. *Efi*.
- ii. *Esito*.
- iii. *Ofu*.
- iv. *Omun*.
- v. *Omunum*.
- vi. *Edebi*.

91. Attie, Lagoons (62, 1900, 114).

- i. *Tsen*.
- ii. *Sempi*.
- iii. *Pite*.

91. Attie, Lagoons—cont.

- iv. *Cui*.
- v. *Kui*.
- vi. *Kone*.

91A. Ebrie (55, 1900, 114).

92. *Id*. (16, 313).

- i. *Sav*.
- ii. *Supi*.
- iii. *Pitv*.
- iv. *Ui*.
- v. *Kui*.
- vi. *Kone*.

93. *Diolu* (45, 79).

- i. *Hatioer*.
- ii. *Hallubuteu*.
- iii. *Hahoediter*.

93. *Diolu*—cont.

- iv. *Hubakien*.
- v. *Hutoken*.
- vi. *Hunamoay* [market, rest] or *Fugandul*.

94. Jukun.

- i. *Abeche*.
- ii. *Dili*.
- iii. *Fefe*.
- iv. *Zozo*.
- v. *Wowo*.
- vi. *Achebejua*.

[See ante, 75.]

95. Kentu, Nigeria.

- i. *Sinamo*.
- ii. *Zinga banai*.
- iii. .. *bige*.
- iv. .. *betai*.

95. Kentu, Nigeria—cont.

- v. *Zinga beniai*.
- vi. .. *bi*.

[See ante, 75; the day names appear to be numerals from two to six, but are not Kentu.]

96. Camba Laego, Nigeria.

- i. *Nyabara nyai*.
- ii. *Usukun nyai*.
- iii. *Buffobel nyai*.
- iv. *Baramdokga nyai*.
- v. *Barampenkyu nyai*.
- vi. *Baramunkia nyai*.

VI.—*Seven-day Week*.

97. Matse, Togoland (40, 81).

- i. *Agble to egbe* (day to begin field work).
- ii. *Agble ve egbe* (2nd day of field work).
- iii. *Domegbe* or *Togbe*.
- iv. *Viegbe* [lucky].
- v. *Vietœgbe* [unlucky].
- vi. *Agble Amiy egbe* [day of god Amiyi].
- vii. *Aweno egagbe* (rest day).

98. Dahomey (30, 354).

- i. *Vodimagbe*.
- ii. *Teni*.
- iii. *Tutu* [? Arabic].
- iv. *Azan* ..
- v. *Lamisi* ..
- vi. *Ahosuzan*.
- vii. *Sibi*.

99. Tan, Togo (61, XIII, 189).

- i. *Kapadziviri* [rest].
- ii. *Ke wo alo*.
- iii. *O wo asu*.
- iv. *O wo asoza*.
- v. *Elowni*.
- vi. *Kisu*.
- vii. *Kepa*.

100. Logba (64, VI, 35).

- i. *Uwlo* [rest].
- ii. *Uwlate*.
- iii. *Uwo*.
- iv. *Mambliwo*.
- v. *Adruva*.
- vi. *Ura*.
- vii. *Ayadzi*.

VI.—*Seven-day Week*—cont.

101. Yewe (64, VI, 271).

- i. *Dokpo*.
- ii. *Ahuava*.
- iii. *Ahuatyo*.
- iv. *Ahunye* [rest].
- v. *Atole*.
- vi. *Trokpo*.
- vii. *Atyewa*.

[All numerals.]

102. Avatime (Kedea), Togo (61, XII, 257).

- i. *Lipadziwoe* (market).
- ii. *Liwɔ alɔ* (work).
- iii. *Lisi*.
- iv. *Lisowoe* (So day).
- v. *Kesekpeliwoe* (rest).
- vi. *Lisopa*.
- vii. *Lipa*.

103. Twi and Guang (42, 41 : 44, Vocab., *passim*).

- i. *Dwo da* [rest].
 - ii. *Ibena da* [fisherman's rest day].
 - iii. *Wuku da*.
 - iv. *Yawo da*.
 - v. *Fi da* [rest from field work].
 - vi. *Memene da*.
 - vii. *Kwasi da*.
- (Guang: week = *ɲk'ek'e*, *nkekue*, *ɲkɛ kukue*).

104. Ewe (*ib.*).

- i. *Kwasi da* [rest].
- ii. *Dzo da*.
- i.i. *Bra da*.
- iv. *Ku da*.
- v. *Yawo da*.
- vi. *Fi da*.
- vii. *Memle da*.

VII.—*Eight-day Week*.

111. Banhun (46, VIII, iii, 819 : 1860 : cf. 33, 92).

They are said to have an eight-day period.

112. Kwa.

- i. *Ederebo*.
- ii. *Abo* [= *Eke* of Ibo].
- iii. *Oruabo*.
- iv. *Fionoden*.

105. Ga, Accra (17, 143 : 42, 42).

- i. *Dsu* [rest ; moon ; purification].
- ii. *Dsufo*.
- iii. *Fso*.
- iv. *So*.
- v. *Soha*.
- vi. *Hɔ*.
- vii. *Hɔgbu*.

106. Baule (13, 133 : 49, II, 548).

- i. *Mone*.
- ii. *Kesie*.
- iii. *Guere*.
- iv. *Muna*.
- v. *We*.
- vi. *Ya*.
- vii. *Fwe*.

107. Lahou, Lagoons (38, 71).

108. Mbato, Lagoons (62, 1900, 114).

109. Wolof (6, 357).

- i. *Assere* [= Saturday].
- ii. *Diber* (rest).
- iii. *Altime* [Arabic].
- iv. *Tulata* ..
- v. *Alarba* ..
- vi. *Alkames* ..
- vii. *Althiuma* ..

[Another authority gives *Besbu ay* (change day), *Diber* (rest day), *Gar* (Saturday), but I have mislaid the reference.]

110. Kanuri (1, III, 154).

Muge is seven or eight-day period.

112. Kwa—cont.

- v. *Oruaiden*.
- vi. ? *Fioneto* [= *Eke*].
- vii. (? *Eteita*).
- viii. *Oruanka*.
- ix. *Fioneto*.

(This is clearly an eight-day period in which, by some accident, *Fioneto* has been interpolated in one place.)

VIII.—*Four-day Congo Week.*

113. Loango (15, 64; 52, XXI, 35; 56, XXIV, 29; 2, I, 209-10).
 i. *Nsota* [also = week: *Nsont*, *Sont*, market day: men's test day].
 ii. *Ndaka*, *Nkanda*, *Ndaka*.
 iii. *Ntota* [women do not *Nkousa*, *Ntont*, plant].
 iv. *Nshi* or *Nzila*, *Nkonge*, *Caba*.
114. Bakamba (12, 148).
 i. *Buduka*.
 ii. *Mpuka*.
 iii. *Nkoy*.
 iv. *Bukondzo*.
115. Bacagni (12, 148).
 i. *Buduka*.
 ii. *Soma*.
 iii. *Nkogo*.
 iv. *Bukondzo*.
116. Bayaka, Bahuana (56, XXXVI, 47).
 i. *Bajuka*.
 ii. *Tek*.
 iii. *Gan*.
 iv. *Pangu* [market].
117. Bambala (56, XXXV, 413).
 i. *Bajuki*.
 ii. *Mosila*.
 iii. *Gando*.
 iv. *Pika* [market].

IX.—*East and North-East Africa.*

118. Waghiama (19, 111; 37, 63).
 i. *Jumwa* (rest).
 ii. *Kwamuka* (? awakening).
 iii. *Kwamuka* (second cultivation).
 iv. *Kwisa* (finish).
119. Gulfan, Kordofan (65, IX, 64).
 i. *Wendegon* (= Sunday).
 ii. *Alon*.
 iii. *Ogaggon*.
 iv. *Willon*.
 v. *Gahenon*.
119. Gulfan, Kordofan—*cont.*
 vi. *Candanon*.
 vii. *Warganon*.
 (day = *veon*; week = *canda*.)
120. Nuba (28, xiv).
 i. *Kerege*.
 ii. *Amel*.
 iii. *Hamel*.
 iv. *Biskid*.
 v. *Bisibidi*.
 vi. *War*.
 vii. *Sunde*.

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55. *Globus*, Hildburghausen.
56. *Journal of the Royal Anthropological Institute*, London.
57. *Mémoires de la Société Ethnologique*, Paris.
58. *Les Missions Catholiques*, Lyons.
59. *Mitteilungen aus den Deutschen Schutzgebieten*, Berlin.
60. *Mitteilungen der Geographischen Gesellschaft*, Jena.
61. *Mitteilungen des Orientalischen Seminars*, Berlin.
62. *Renseignements Coloniaux*, Paris.
63. *Revue de Géographie*, Paris.
64. *Zeitschrift für Afrikanische und Oceanische Sprachen*, Berlin.
65. *Zeitschrift für Kolonialpolitik*, Berlin: continued as
66. *Zeitschrift für Eingeborensprachen*, Berlin.
67. *Zeitschrift für Vergleichende Rechtswissenschaft*, Berlin.



FIG. 1.—STONE CIRCLE AND CAPSTONE, GRAVE NO. 3, ODUGATTUR.



FIG. 2.—HANUMAN SHRINE.

NOTE ON SOME IRON AGE GRAVES AT ODUGATTUR, NORTH ARCOT DISTRICT,
SOUTH INDIA.



FIG. 1.—TRIPOD JARS.



FIG. 2.—SPHEROIDAL JARS.

NOTE ON SOME IRON AGE GRAVES AT ODUGATTUR, NORTH ARCOT DISTRICT,
SOUTH INDIA.

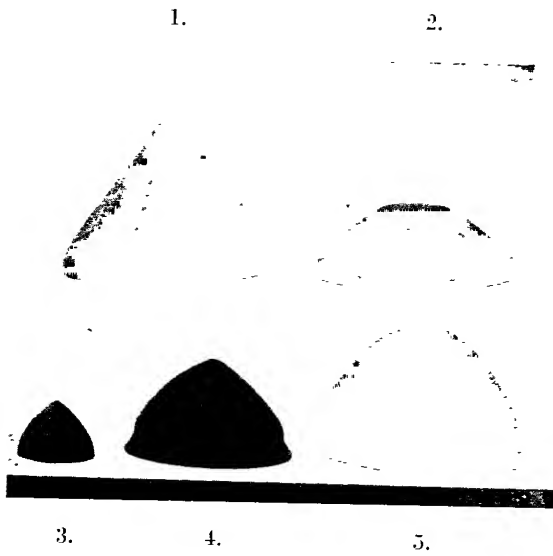


FIG. 1.—CONICAL JARS.

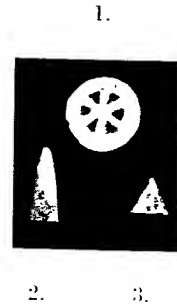


FIG. 3.—CHANK SHELL CHIPS.

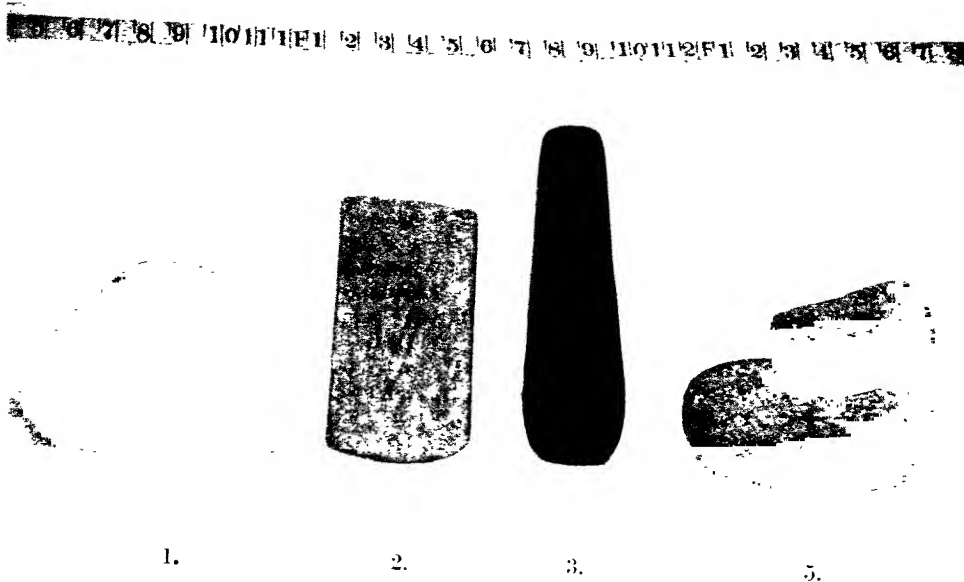


FIG. 2.—STONE UTENSILS.

NOTE ON SOME IRON AGE GRAVES AT ODUGATTUR, NORTH ARCOT DISTRICT,
SOUTH INDIA.



CHANK SHELL OBJECTS.

NOTE ON SOME IRON AGE GRAVES AT ODUGATTUR, NORTH ARCOT DISTRICT,
SOUTH INDIA.



LA RACE DE NÉANDERTHAL ET LA RACE DE GRIMALDI ; LEUR RÔLE DANS L'HUMANITÉ.

The Huxley Memorial Lecture for 1924.

By Prof. R. VERNEAU.

LES importantes découvertes modernes effectuées dans le domaine de la Paléontologie humaine et celles, beaucoup plus nombreuses, qui se réfèrent à la période néolithique, permettent d'aborder aujourd'hui l'examen d'un problème qui ne me semble pas dépourvu d'intérêt : quel est, peut-on se demander, le rôle qu'a joué, dans le passé, l'élément nigritique dans l'ethnologie mondiale ?

En ce qui concerne l'Europe occidentale et centrale, la question ne se pose pas pour la première fois. Dès 1833, Schmerling publiait un intéressant travail intitulé : *Recherches sur les ossements fossiles des cavernes de la province de Liège*, et, parmi ces ossements, figuraient quelques restes humains recueillis dans la caverne d'Engis. Une calotte crânienne, qu'il avait d'ailleurs examinée superficiellement, l'avait frappé par l'étroitesse et l'allongement du front et par le développement de la région occipitale : il en concluait que ce crâne se rapprochait *plus de celui de l'Éthiopien que de celui de l'Européen*. Il est presque superflu de faire remarquer qu'à cette époque, le mot " Éthiopien " était pris dans le sens de " Nègre." Toutefois, Schmerling n'osait pas être trop affirmatif, car, disait-il, " l'on ne peut, sans s'exposer aux plus grandes inconséquences, conclure d'un seul fragment de crâne pour la forme totale de la tête."

On ne parla plus de la théorie négroïde jusqu'au jour où Spring découvrit au mont Chauvaux, dans la province de Namur, des ossements, réputés fossiles, qui gisaient dans une caverne, à 40 mètres au-dessus du niveau de la Meuse. D'autres trouvailles avaient cependant été faites, en 1839, dans le duché de Bade sans attirer d'une façon bien spéciale l'attention sur le point qui nous intéresse. Spring décrivit les ossements qu'il avait recueillis, mais il n'avait fait aucun rapprochement entre leurs caractères et ceux des Nègres. Voici les traits principaux qu'il avait notés sur la tête : crâne très petit d'une manière absolue, très petit également lorsqu'on le compare au développement considérable des mâchoires : front fuyant, temporaux aplatis, narines larges, arcades dentaires très volumineuses, inclinées en avant et supportant des dents très obliques ; angle facial d'environ 70 degrés. En 1859, à une séance de la Société d'Anthropologie de Paris, Broca en tira la conclusion qu'il s'agissait d'une race aujourd'hui éteinte, selon toutes probabilités, race qui offrait

des "caractères évidents d'infériorité." Quant aux crânes découverts dans les environs de Baden, ils présentaient, selon lui, "les caractères du type africain." ("était, d'ailleurs, l'opinion qui avait cours en Allemagne.

Entre temps, une découverte des plus importantes avait eu lieu en 1856 : je veux parler de la célèbre calotte crânienne de Néanderthal. Elle présentait des caractères si étranges que certains savants, à l'exemple de R. Virchow, se refusèrent à admettre qu'elle eût appartenu à un être normal : beaucoup déclarèrent qu'on se trouvait en présence d'un crâne d'idiot. Schaaffhausen et l'éminent Thomas Henry Huxley n'hésitèrent pas à proclamer que l'Homme de Néanderthal était le représentant d'une race humaine primitive, offrant encore des caractères simiens. On sait comment les découvertes postérieures et les études qu'elles provoquèrent leur donnèrent raison.

Huxley ne s'en tint pas là. Le premier, il eut l'idée de rechercher si, parmi les populations les plus primitives de l'Humanité actuelle, il ne s'en trouvait pas qui eussent conservé des ressemblances avec le type archaïque rencontré dans la petite grotte de Feldhofer. Il compara l'Homme de Néanderthal aux Australiens et, tout en déclarant qu'il n'avait nullement l'intention d'affirmer que cet Homme appartint à la race australienne, il insistait sur la "forte similitude dans la configuration du crâne" qu'il avait constatée. Il avait cependant formulé certaines réserves dans ses *Observations au sujet des crânes humains d'Engis et de Néanderthal* qui ont paru, en 1863, dans le livre de Ch. Lyell (*The Geological Evidences of the Antiquity of Man*). Ces réserves s'expliquent aisément : Huxley avait envisagé les Australiens dans leur ensemble et il avait remarqué qu'il n'y avait pas concordance absolue entre leurs caractères céphaliques et ceux de l'Homme fossile. Mais bientôt il limita sa comparaison à un groupe australien particulier, qui avait été rencontré à Port-Western, et les similitudes lui apparurent avec beaucoup plus de netteté. Dans son bel ouvrage intitulé : *Evidence as to Man's Place in Nature*, qui a été publié quelques mois plus tard, il s'est montré bien moins hésitant.

Ce n'est pas seulement à Port-Western qu'existe le type australien qui avait frappé Huxley par ses caractères céphaliques si voisins de ceux de l'Homme de Néanderthal ; il a été fréquemment observé depuis dans le Sud de la Nouvelle-Hollande. Dans une intéressante communication à la "Anthropological Society" de Londres sur les diverses formes crâniennes qu'on trouve en Australie, Carter Blake dit que le type signalé par Huxley se retrouve également dans le Queensland. En 1844, Meredith avait déjà mentionné diverses tribus de la colonie de Victoria que caractérisait l'aplatissement de la voûte de leur crâne. Aitken Meigs, en 1857, dans le catalogue de la collection Morton, avait décrit sommairement un crâne de Port-Philippe, dont les caractères lui avaient paru mériter une mention spéciale : "C'est," dit-il, "une tête vraiment animale. Le front est excessivement plat et fuyant, tandis que, par son prognathisme, la mâchoire supérieure dégénère presque en museau. L'arcade alvéolaire, au lieu d'être ronde ou ovale dans son contour, est presque carrée.

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La tête est allongée en totalité et déprimée le long de la région coronale. la base du crâne est plate et les apophyses mastoïdes sont très larges et grossières. Les orbites immenses sont débordées par de lourds arcs sourciliers." Cette description peut s'appliquer presque textuellement à l'Homme de La Chapelle-aux-Saints et aux autres fossiles de la race de Néanderthal. Il n'y a guère que les apophyses mastoïdes qui, par leur largeur, distinguent l'Australien de Port-Philippe de nos Moustériens. L'arcade alvéolaire supérieure presque carrée de cet homme se retrouve sur le crâne masculin de La Ferrassie.

Tenant compte des diverses observations publiées avant l'apparition de leurs *Crania ethnica*, auxquelles ils ont ajouté leurs observations personnelles, A. de Quatrefages et E. Th. Hamy n'ont pas hésité à accepter le rapprochement établi par Huxley. Ils admettent avec lui que l'Homme de Néanderthal est comparable au type australien du Sud, qu'ils qualifient de "néanderthaloloïde." Voici en quels termes ils expriment leur opinion : "La description des crânes d'Adélaïde, etc., qui vient de passer sous les yeux du lecteur, a pu lui montrer combien les ressemblances ostéologiques sont étroites, dès à présent, entre ces tribus de la côte sud du continent australien et les premiers hommes établis en Europe. Tout porte à croire que mieux ces Australiens dolichoplatycéphales seront étudiés, plus complets seront les fossiles humains dont l'avenir ne peut manquer de nous révéler l'existence, et plus les liens se resserreront encore entre ces deux groupes ethniques si éloignés cependant dans l'espace et dans le temps."

C'était en 1882 que de Quatrefages et Hamy écrivaient ces lignes. Pour décrire les caractères du type fossile qu'ils rapprochaient de l'Australien néanderthaloloïde, ils n'avaient à leur disposition, en dehors de la voûte crânienne de l'Homme de Néanderthal et de quelques mandibules incomplètes, que quelques fragments de crânes découverts en Europe dans des couches géologiques paraissant remonter au Pléistocène ancien. Quatre ans plus tard, au mois de juin 1886, Maxime De Puydt et Max Lohest découvraient dans une caverne, à Spy, province de Namur, les squelettes de deux sujets qui permirent de compléter, dans une bonne mesure, les rares données que nous possédions sur la race de Néanderthal. Depuis, les trouvailles se sont multipliées, en France principalement, mais une importante découverte faite dans l'Afrique australe, dans la Rhodesia, a démontré que le même type a vécu autrefois dans des contrées fort éloignées les unes des autres. Il est partout d'une remarquable homogénéité et il n'est plus permis de voir dans l'Homme de Néanderthal, un malade ou un idiot : il représente un type ethnique primitif, qui possédait encore un certain nombre de caractères simiens, ainsi que l'avaient proclamé Schaaffhausen et Huxley et que le reconnaissent tous les savants actuels, exempts de parti-pris. Il est, à mon sens, tout aussi incontestable que, par l'ensemble de leurs caractères, les Néanderthaliens ne peuvent être rattachés qu'au groupe nigritique, et j'estime qu'il est facile de le démontrer. Mais quelle est l'importance du rôle qu'ils ont joué dans l'Humanité ? C'est là un point sur lequel il existe un désaccord complet entre les

hommes de science. La question me paraît assez intéressante pour mériter d'être examinée avec quelques détails.

* * * * * *

Quand, avec Huxley, de Quatrefages et Hamy — pour ne citer que quelques noms de savants partageant cette opinion — on admet qu'il existe encore en Australie des représentants du type de Néanderthal qui, dans le cours des siècles, a subi certaines modifications sous l'influence du milieu, la réponse est toute simple : ce type a joué un rôle assez notable, puisqu'il a pu se perpétuer jusqu'à nos jours dans une contrée où, de l'avis de tous, le milieu est resté relativement stable. En Europe, ses traces sont, dans l'état actuel de nos connaissances, plus difficiles à suivre. Toutefois, de Quatrefages et Hamy considèrent certains caractères observés sur des crânes néolithiques, ou même sur des crânes modernes, comme des manifestations ataviques d'un état ancestral. D'après cette conception, l'Homme de Néanderthal compterait parmi nos ancêtres.

Admise par beaucoup d'anthropologistes — au nombre desquels je figure — cette théorie a été vivement combattue par ceux qui ne pouvaient se résigner à voir inscrire, dans notre lignée d'aïeux, un être qui possédait encore des caractères simiens. Les adversaires des doctrines de Lamarck, d'Étienne Geoffroy Saint-Hilaire, de Darwin, d'Huxley, de Lyell et de tant d'autres, devaient naturellement prendre place parmi les adversaires de la théorie de de Quatrefages, qui, cependant, avait combattu le transformisme, mais qui était trop homme de science pour ne pas s'incliner devant les faits. La plupart du temps, on discuta sur des détails et on négligea de tenir compte de lois biologiques à l'abri de toute critique.

Aujourd'hui, toute une école, qui comprend d'éminents savants, au savoir et à la sincérité desquels je rends pleinement hommage, et qui, pour la plupart, se déclarent évolutionnistes, proclame que l'Homme de Néanderthal n'a légué aucune goutte de son sang à l'Humanité actuelle, et que l'*Homo Neanderthalensis* constitue une espèce éteinte qu'a remplacée l'*Homo sapiens*. Discuter une théorie en vogue est toujours une tâche ingrate, surtout lorsqu'on a en face de soi des adversaires dont on reconnaît la haute valeur. Il me sera permis, néanmoins, d'exposer les arguments invoqués par les partisans des idées nouvelles et les raisons qui m'empêchent de partager leur opinion.

Les paléontologistes, se basant sur l'extinction d'espèces animales dans les temps géologiques, déclarent qu'il en a été de même pour l'Homme, qui ne saurait faire exception à la règle générale. J'admets, sans la moindre restriction, que l'être humain soit soumis à toutes les grandes lois qui régissent les autres êtres organisés, mais il s'agit de découvrir en vertu de quelle loi les espèces disparues se sont éteintes ; il ne me paraît pas douteux que ce soit en vertu de la loi d'adaptation de l'organisme au milieu. Quand de profondes modifications surviennent dans le milieu, comme ce fut le cas aux périodes géologiques passées, l'organisme n'étant plus en harmonie avec les nouvelles conditions d'existence que l'être organisé est incapable de modifier,

et auxquelles il ne peut s'adapter, cet être doit forcément disparaître. Pour l'Homme, les faits ne se présentent pas sous le même aspect. Depuis le début du Quaternaire, c'est-à-dire depuis l'époque où nous suivons ses traces avec certitude, il s'est bien produit, dans nos contrées, des changements dans le milieu, mais ces changements n'ont pas été assez considérables pour mettre l'être humain dans l'impossibilité d'adapter son organisme aux conditions nouvelles. Nous en avons la preuve dans la découverte, à tous les niveaux, des restes de son industrie. Mais, il est une autre considération dont on oublie de faire état : c'est que l'émigration ou l'extinction des espèces pléistocènes appartenant soit à la faune chaude, soit à la faune froide, paraissent en relation étroite avec les conditions climatiques, contre lesquelles l'Homme — même le plus primitif — trouve dans son intelligence les moyens de lutter. Il s'ensuit que, tout en subissant, dans une certaine mesure, l'action du milieu et en y adaptant progressivement son organisme, il n'en ressent pas le choc violent qui entraîne la disparition d'autres espèces.

Parmi ceux qui acceptent les yeux fermés les idées nouvelles et qui s'attachent aux mots plutôt qu'aux faits, il en est qui pourront m'objecter — et le cas s'est produit — qu'il n'est pas prouvé que l'Homme de Néanderthal fût pourvu d'intelligence. Ce qui motive leur doute, ce sont les expressions dont on se sert pour désigner l'Humanité primitive, ou, du moins, l'une de ses branches qu'on déclare éteinte, et l'Humanité actuelle caractérisée par l'*Homo sapiens*. Le qualificatif "sapiens" est tout à fait impropre car il ne peut s'appliquer qu'à des qualités morales ou intellectuelles, qu'on n'est nullement en droit d'accorder à l'*Homo sapiens* seul, à l'exclusion de l'*Homo Neanderthalensis*. En ce qui concerne ce dernier, nous ne pouvons émettre que de pures hypothèses au sujet de ses qualités morales, mais il en est tout autrement de son intelligence. Ici, je laisse la parole à l'un des partisans les plus éminents et les plus convaincus de l'extinction complète et ancienne de l'espèce "neanderthalensis," à mon savant collègue et ami, M. Boule. Après avoir constaté, dans son beau livre sur *Les Hommes fossiles*, que certaines populations attardées de l'Humanité actuelle — qu'il range, néanmoins, dans le groupe *Homo sapiens* — peuvent être rapprochées "sinon au point de vue physique, du moins au point de vue moral," et par leur genre de vie de l'*Homo Neanderthalensis*, il ajoute : "Celui-ci est déjà un Homme, malgré l'infériorité morphologique de son cerveau, et nullement un pré-Homme, car avec son squelette gisent pêle-mêle les instruments de pierre qu'il savait fabriquer, les charbons et les cendres des foyers qu'il savait allumer et alimenter. Ses moyens d'action sont déjà ceux des sauvages actuels. Et si les naturalistes, abandonnant leurs méthodes générales, donnaient la prééminence aux caractères intellectuels pour classer les êtres qu'ils étudient, il n'y aurait pas lieu de séparer, à titre spécifique, l'*Homo Neanderthalensis* des Hommes actuels, tandis, nous l'avons vu, qu'on ne peut lui refuser cette distinction d'après ses caractères physiques."

L'auteur va plus loin. Nous savons que l'Homme de Néanderthal, qui semble avoir vécu à l'époque moustérienne, vers le milieu du Quaternaire, a eu des prédécesseurs, dont nous ignorons à peu près totalement les caractères physiques, mais dont nous connaissons l'industrie. Ces prédécesseurs étaient "de vrais Hommes dans toute l'acception du mot, au moral comme au physique, car ces Hommes savaient, avec des matériaux choisis, fabriquer des outils, de beaux outils; un sentiment esthétique accompagnait déjà chez eux le génie de l'invention, car les formes élégantes des silex de Saint-Acheul représentent une première recherche d'art. Ils savaient faire du feu, l'acte humain par excellence, celui qui est à la base de tous les progrès futurs, qui contient en puissance toutes les civilisations . . . Certes, l'invention des premiers instruments, la production du feu sont le résultat de phénomènes intellectuels aussi merveilleux que les plus grandes inventions modernes qu'elles ont permis d'accomplir."

Voilà la question posée sur son véritable terrain : ce n'est pas par ses facultés intellectuels, comme pourrait le faire supposer le qualificatif dont on l'a gratifié, que l'*Homo sapiens* se distingue de l'*Homo Neanderthalensis*. Ce sont les caractères physiques de ce dernier qui l'isoleraient complètement de l'Humanité actuelle, même des populations les plus primitives. Il nous faut donc examiner rapidement ces caractères spécifiques. Pour ne pas me laisser entraîner trop loin, je m'en tiendrai presque exclusivement aux caractères céphaliques, et je prendrai comme type de l'Homme de Néanderthal, l'Homme de La Chapelle-aux-Saints, le mieux étudié et le plus complet des Moustériens.

* * * * *

L'Homme fossile de La Chapelle-aux-Saints a été décrit avec le soin le plus méticuleux par le professeur M. Boule dans un luxueux mémoire de 278 pages in-4^o, illustré de 16 planches et de 101 figures dans le texte. La description de la tête occupe à elle seule 89 pages, où figurent de très nombreuses mesures. Je ne saurais donc songer à suivre l'auteur dans tous les détails qu'il donne et dont beaucoup n'ont aucune valeur ethnique, comme il le reconnaît lui-même. Ainsi, les indices céphaliques rentrent dans les moyennes que fournissent les races actuelles "ce qui répond, dit-il, à la conception qu'on peut se faire d'un type sinon primitif, du moins encore peu spécialisé." Dans l'Humanité actuelle, on rencontre des races qui, tout en offrant un type nettement spécialisé, donnent pourtant des indices céphaliques moyens. Les longueurs relatives des os qui forment la boîte encéphalique n'ont rien de caractéristique chez les Néanderthaliens, puisque la courbe frontale égale la courbe pariétale sur le crâne de La Chapelle-aux-Saints, tandis qu'elle est notablement plus longue sur le crâne de Néanderthal, et plus courte, au contraire, sur le crâne n° 1 de Spy. Il en est de même de la capacité crânienne, très élevée chez l'Homme de La Chapelle-aux-Saints (1600 centimètres cubes environ) mais inférieure à ce chiffre de 400 à 450 centimètres cubes chez d'autres. C'est exactement ce que l'on constate "dans les races humaines actuelles, sauvages ou civilisées," dit M. Boule. Il serait donc oiseux

d'insister sur ces caractères, que je qualifierai d'indifférents, pas plus que sur des détails ostéologiques que les anatomistes observent fréquemment sur des sujets modernes et qu'ils considèrent comme des variations individuelles. Mon but consiste à rechercher si, dans sa morphologie céphalique, l'*Homo Neanderthalensis* offre de grands caractères qui lui soient spéciaux et qui le distinguent de l'*Homo sapiens* des adeptes de l'école nouvelle dont je viens de parler.

Il faudrait, certes, être animé d'une forte dose de parti-pris pour ne pas reconnaître que la morphologie générale de la tête présente, chez les Néanderthaliens, un aspect étrange, qui est dû principalement à l'aplatissement du crâne, à la fuite du front, à la saillie en arrière de l'occipital qui forme une sorte de chignon, à l'énorme bourrelet continu formé par les arcades sourcilières, au grand volume de la face, aux dimensions considérables des orbites, à la grande largeur du nez, au défaut de modelé des maxillaires supérieurs, qui se projettent fortement en avant, de même que toute la face, et à la fuite du menton. En dehors de ces caractères, qui frappent à première vue, il en est d'autres qui ont également une valeur incontestable, surtout la position du trou occipital, reporté très loin en arrière. Nous allons passer rapidement en revue ces caractères et voir s'ils sont l'apanage exclusif de l'*Homo Neanderthalensis*.

L'aplatissement de la voûte crânienne peut être évalué mathématiquement au moyen des indices verticaux. Il est à peine besoin de rappeler que l'indice vertical de Broca est le rapport entre le diamètre vertical basilo-bregmatique et le diamètre antéro-postérieur maximum du crâne : que l'indice transverso-vertical indique le rapport entre le même diamètre vertical et le diamètre transverse maximum, et que l'indice mixte de Topinard représente la moyenne des deux précédents. Or voici quelques chiffres que j'emprunte au travail de Marcellin Boule sur l'*Homme fossile de La Chapelle-aux-Saints* et qui ont leur éloquence :

Origine des crânes.	Indices verticaux.		
	vertical.	transv.-vert.	mixte.
Crâne de La Chapelle-aux-Saints	62.9	83.9	73.4
.. australien (série Basedow n° 21)	63.5	88.6	76.0
.. .. (série Sollas n° 998)	66.3	98.4	82.3
.. de femme boschimane (Vénus hottentote) .	70.1	90.9	80.5
.. de Trenton (Hrdlicka)	63.0	79.5	71.2
.. de la cathédrale de Brême (Guldemeister) ...	59.5	79.1	68.9
.. de Français (Boule)	76.8	92.5	84.6

M. Boule fait observer que le crâne australien n° 21 de Basedow est le plus surbaissé de la série, de même que le n° 998 de la série Sollas. Je remarquerai, à mon tour, que tous les Néanderthaliens n'ont pas des indices aussi bas que l'Homme de La Chapelle-aux-Saints qui, à beaucoup de points de vue, exagère les caractères du type.

Ce qui ressort des chiffres qui précèdent, c'est que le surbaissement de la voûte crânienne se rencontre nettement accusé chez des sujets appartenant aux races les plus diverses. C'est en Europe, sur un individu moderne, que le maximum d'aplatissement a été observé. Il est vrai qu'il s'agit de cas individuels, mais il existe deux groupes nigritiques, l'un en Afrique (les Boschimans), l'autre en Australie (les Néanderthaloïdes du Sud), chez lesquels ce caractère est la règle. Il est fréquent aussi chez des populations sibériennes, qui n'ont, d'ailleurs, rien à voir avec l'*Homo Neanderthalensis*.

A propos de la fuite du front, je pourrais presque répéter ce que je viens de dire du surbaissement de la voûte : on en rencontre des cas individuels très accentués dans les races les plus diverses. Mais c'est surtout en Australie que ce caractère se montre d'une grande fréquence. Tous les auteurs qui ont étudié des crânes des tribus méridionales ont insisté sur l'aspect du front, qui est en même temps très fuyant et plat, ce qui s'observe sans peine sur les sujets vivants. A la partie antérieure, le frontal se termine par de lourdes arcades sourcilières qui se continuent, " sans interruption bien marquée avec des apophyses orbitaires externes épaisses et saillantes." disent les auteurs des *Crania ethnica*. Comme chez l'*Homo Neanderthalensis*, ces arcades se prolongent au-dessus et en avant des orbites de façon à former une sorte de visière. En général, les arcs sourciliers ne présentent pas le relief énorme qu'on observe sur les crânes de Néanderthal et de La Chapelle-aux-Saints, où elles ont l'aspect d'un bourrelet, longé, à sa partie supérieure, par un sillon transversal. Ici, encore, je dois faire remarquer que les deux Néanderthaliens dont il s'agit *exagèrent* un caractère de leur groupe et que les crânes de Spy, par exemple, ressemblent singulièrement sous ce rapport aux Australiens, que je persiste à qualifier de " néanderthaloïdes," des tribus du Sud de la Nouvelle-Hollande. La saillie du bourrelet peut être évaluée, d'une façon très approximative, par la longueur de la courbe ophryo-nasale : or les chiffres qui suivent montrent que la moyenne de cette courbe, pour les quatre Australiens du Sud étudiés par A. de Quatrefages et E. Hamy, est égale à la courbe du crâne n° 2 de Spy et supérieure à celle du Spy n° 1 :

Courbe ophryo-na-sale du crâne de Néanderthal	..	..	..	43 mm.
.. .. de l'Homme de La Chapelle-aux-Saints	..	..	..	35 ..
.. .. du crâne de Spy n° 2	..	..	..	28 ..
.. .. des Australiens du Sud	..	..	..	28 ..
.. .. du crâne de Spy n° 1	..	..	..	25 ..

L'étroitesse du front par rapport à la largeur maxima de la tête ne mérite pas de nous arrêter. Chez nos Australiens et chez d'autres populations, l'indice fronto-pariétal se confond avec celui des Néanderthaliens.

La morphologie spéciale de la région occipitale, qui avait si vivement appelé l'attention de Huxley lorsqu'il examina le crâne de Néanderthal et qui le frappa tout aussi fortement quand il étudia le crâne dolichoplatycéphale de Port-Western, est aussi caractéristique des Australiens du Sud que des Néanderthaliens. Comme

ceux-ci, nos "Néanderthaloïdes," de la Nouvelle-Hollande ont l'occiput extrêmement aplati de haut en bas, extrêmement saillant en arrière, avec un inion situé sensiblement au-dessous de la portion de l'écaille occipitale où tombe le diamètre antéro-postérieur maximum du crâne. Comme chez eux, les courbes affectent une direction telle que la ligne tracée du lambda à l'inion se dirige obliquement de haut en bas et d'avant en arrière. La seule différence qu'on puisse signaler entre l'Homme de La Chapelle-aux-Saints et le type australien que nous envisageons consiste, dans cette partie de la tête, en l'absence de la protubérance occipitale externe chez le premier, où elle est remplacée par une dépression, tandis que chez le second, il semble qu'il existe habituellement — à en juger par les spécimens que j'ai pu examiner — une protubérance, d'ailleurs assez peu volumineuse. Si la particularité dont il s'agit est constante, il me paraît difficile d'y attacher une réelle valeur, car des muscles d'égale puissance s'insèrent tout aussi bien dans une cavité que sur une saillie. Je noterai en passant que le chignon occipital se rencontre fréquemment de nos jours, parfois très prononcé, chez des individus appartenant à tous les grands groupes de l'Humanité et que, dans une contrée de la Corse, par exemple, on l'observe chez presque tous les habitants.

Sur les autres caractères du crâne proprement dit, je serai bref. La petitesse des apophyses mastoïdes des Néanderthaliens est assurément un trait qu'on ne peut passer sous silence, car on a signalé, sur des crânes australiens "néanderthaloïdes," des apophyses, au contraire, volumineuses. Mais ce caractère n'influe guère sur la morphologie générale de la tête. Je pourrais faire remarquer, cependant, qu'il arrive à tout moment à ceux qui mesurent de nombreux crânes et qui veulent en diagnostiquer le sexe, de se trouver en face de crânes d'un même type dont certains inspirent quelques doutes parce que, tout en présentant des apparences de robusticité, ils ne possèdent que des apophyses mastoïdes très réduites dans leurs dimensions. Il est donc des cas où ces apophyses sont dépourvues, non seulement de signification ethnique, mais même de signification sexuelle. Je pourrais en dire autant du faible développement de l'écaille temporale et du peu de courbure de la suture temporo-pariétale, qui ne sauraient sûrement pas être considérés comme des caractères ethniques, car on les observe sur des types fort différents. La position du trou occipital a plus d'intérêt. Il est certain que, chez l'Homme de La Chapelle-aux-Saints, il est situé sensiblement plus en arrière que dans aucun des *groupes* humains actuels que nous connaissons. Pour préciser la position qu'il occupe, on a calculé les rapports entre la projection antérieure et la projection totale de la tête et, d'autre part, entre la projection postérieure et la projection totale. Ce dernier rapport n'est que de 33.2 p.100 chez le fossile de la Corrèze, tandis que le chiffre le plus faible trouvé chez une race actuelle (Néo-Calédoniens) ne descendrait pas au-dessous de 37.7. Il convient de remarquer que le premier de ces chiffres ne correspond qu'à un Néanderthalien et que nous ignorons quelle serait la moyenne du groupe, tandis que le deuxième chiffre représente une moyenne comprenant par conséquent des sujets qui devaient donner

un rapport sans doute bien voisin de celui trouvé chez l'Homme de La Chapelle-aux-Saints. La position du trou occipital varie, en effet, considérablement suivant les individus : sur 104 sujets, appartenant à six races distinctes, Wyman a obtenu, pour le rapport dont il s'agit, des chiffres qui oscillent entre 35.6 et 50. Sur une petite série de 15 Américains du Nord, l'écart entre les extrêmes atteignait 13 unités.

Je ne m'étendrai pas d'avantage sur le crâne proprement dit et je serai beaucoup plus bref pour la face, mon savant collègue déclarant que l'*Homo Neanderthalensis* "est plus rapproché de son congénère, l'Homme actuel, par sa face." Il est cependant des caractères dont je ne puis me dispenser de parler, étant donnée l'importance qu'on attache, non sans raison, au grand développement de la région faciale par rapport à la portion cérébrale de la tête chez les Néanderthaliens, aux dimensions des orbites, à la morphologie du nez et des maxillaires.

Le volume relatif de la face et du crâne est assurément très difficile à préciser. Les angles n'ont qu'une valeur des plus minimes et les procédés graphiques, comme celui qu'a employé le Dr. Statz, sont notoirement très défectueux parce qu'ils ne donnent pas le *volume* de la face, car ils ne tiennent pas compte des trois dimensions essentielles de cette partie de la tête. La procédé auquel j'ai eu recours (celui basé sur le module de Schmidt) n'est certes pas à l'abri de la critique, mais il a l'avantage de faire entrer dans le calcul les diamètres basilo-alvéolaire, bizygomatique et naso-alvéolaire. J'ai fait abstraction de la mandibule parce que, sur un grand nombre de pièces, la chute des dents ne permet pas de mesurer avec précision la hauteur nasomentonnière. Enfin, j'ai comparé le volume de la face, non à la capacité crânienne, mais au volume extérieur du crâne évalué par la méthode de Broca. Le rapport entre le volume de la portion faciale et celui de la portion encéphalique de la tête atteint 41 chez l'Homme de La Chapelle-aux-Saints, en d'autres termes le volume de la face représente presque exactement les $2\frac{1}{5}$ de celui du crâne. Les autres Néanderthaliens ayant, pour la plupart, leur région faciale très incomplète, nous ignorons si ce chiffre correspond à la moyenne de la race. Quatre Namaquas de sexe masculin m'ont donné comme moyenne l'indice 36, chiffre qui ne paraîtra pas bien éloigné du précédent quand j'aurai dit que, dans certains groupes humains, il tombe à 24.

Faute de pièces pourvues de leurs faces, je n'ai pu étudier ce caractère chez les Australiens néanderthaloides pas plus que leurs autres caractères faciaux naturellement. Nous savons cependant, par les renseignements publiés par R. Owen, Aitken Meigs, S. M. Bradley, qu'ils ont un tel prognathisme que leur "mâchoire supérieure dégénère presque en museau," qu'ils ont des "orbites immenses débordées par de lourds arcs sourciliers," que leur nez est très large et très déprimé à la racine, que leur menton est fuyant et que leur dentition robuste comprend des molaires inférieures à cinq tubercules. Ces caractères sont précisément ceux qu'on observe chez les Néanderthaliens et dont plusieurs se montrent plus accentués encore, d'après Fritz Sarasin, chez les Néo-Calédoniens. Il convient de noter, pour le but que je me propose, que ce sont des traits essentiellement nigritiques. M. Boule insiste sur une parti-

cularité des maxillaires supérieurs de l'Homme de La Chapelle-aux-Saints : " Leur face antérieure, " dit-il. " au lieu d'être concave et de présenter des *fosses canines*, comme chez tous les Hommes actuels sans exception, est à peu près plane. " Dans la collection anthropologique du Muséum national d'Histoire naturelle, il existe des crânes d'Australiens modernes et de Nègres d'Afrique, notamment un crâne de Nègre des rives du Chiré, dont les maxillaires supérieurs ne présentent pas de *fosses canines* et ont leur face antérieure remarquablement plane.

Je laisse de côté les autres parties du squelette et le cerveau, quoiqu'on leur ait attaché une très haute importance. De la rétroversion de l'extrémité supérieure du tibia et du défaut de courbures de la colonne vertébrale, par exemple, on a conclu que l'*Homo Neanderthalensis* ne se tenait pas dans la position verticale. Je ne contesterai pas cette conclusion : je me bornerai simplement à faire observer que, dans les populations actuelles à attitude verticale, on rencontre des individus dont les plateaux du tibia sont aussi rétroversés que chez l'Homme de La Chapelle-aux-Saints : tel est le cas d'un tibia d'Australien d'Alice Springs figuré sur la planche I de la IV^e partie du *Report on the Work of the Horn Scientific Expedition to Central Australia*. En ce qui concerne la colonne vertébrale, il est difficile d'être affirmatif lorsqu'on n'en possède que quelques parties en bon état. Même quand il s'agit d'un squelette en parfait état, les courbures qu'un monteur imprime à la colonne dépendent surtout des feutres qu'il emploie pour remplacer les cartilages.

Quant au cerveau, j'ai l'absolue conviction qu'il est impossible d'en décrire la morphologie lorsqu'on ne possède qu'un moulage intracranien. Boule et Anthony l'ont implicitement reconnu en étudiant le cerveau de l'Homme de La Chapelle-aux-Saints sur un moulage de ce genre, puisqu'ils ont dû envisager diverses positions possibles pour la scissure de Rolando. Qu'il me soit permis, à ce propos, de citer une observation personnelle, qui remonte à l'époque lointaine où j'étais étudiant en médecine et qui prouve combien il faut être prudent à cet égard. On s'occupait beaucoup alors de la localisation du langage articulé dans l'encéphale. Or, en pratiquant l'autopsie d'un homme qui, durant toute sa vie, avait présenté des troubles de l'articulation, je fus vivement frappé, avant d'enlever les méninges, de constater une dépression à la place que devait occuper normalement la circonvolution de Broca. Je croyais déjà être entre en présence d'un cas, sinon d'absence, tout au moins d'atrophie de la fameuse circonvolution. A peine les méninges furent-elles incisées qu'une grosse circonvolution fit hernie. Si elle n'était pas apparente à travers les enveloppes du cerveau, *à fortiori* eut-il été impossible d'en découvrir la moindre trace sur un moulage intracranien.

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De ce qui précède, il ressort qu'il n'est pas un caractère nettement observé chez l'*Homo Neanderthalensis* qui ne se rencontre dans l'Humanité actuelle, principalement chez les races nigritiques. Mais, comme l'a dit fort justement le professeur M. Boule, ce n'est pas l'existence de tel ou tel caractère isolé qui offre de l'intérêt au

point de vue où nous nous plaçons : " c'est la présence, la réunion, l'accumulation de tous ces caractères sur *chaque* crâne de toute une série . . ." qui peut avoir de la valeur. Or, chaque crâne de la série d'Australiens du type que j'ai envisagé présente une telle accumulation de caractères de la race de Néanderthal qu'il m'est impossible de ne pas admettre entre les deux groupes des liens de parenté. C'est pour cette raison que je me suis étendu un peu longuement sur les Australiens néanderthaloïdes parce qu'ils prouvent, à mon sens, que la race de Néanderthal ne s'est pas " éteinte sans laisser de postérité " et que, par suite, cette race nigritique, qui a joué un rôle à une période archaïque, a fait sentir son influence sur l'Humanité actuelle.

D'ailleurs, M. Boule, après avoir formulé son opinion sur l'extinction de la race, fait quelques réserves. Il déclare ignorer s'il y a eu " déplacement, migration, ou bien extinction sur place," et il n'est pas loin d'admettre que l'*Homo Neanderthalensis* ait exercé une certaine action sur l'Homme moderne. Il écrit en effet ceci : " Je ne voudrais pas affirmer qu'il n'y ait jamais eu infusion de sang néanderthaloïde, par voie d'hybridation, dans d'autres groupes humains appartenant au rameau ou à l'un des rameaux de l'*Homo sapiens*. Mais ce qui me paraît certain, c'est que cette infusion n'a été qu'accidentelle, car aucun type humain actuel ne saurait être considéré comme un descendant direct, même modifié du type de Néanderthal." Ses doutes sur la disparition totale de ce type à une époque remontant à peu près au milieu des temps quaternaires semblent s'être accrus depuis la découverte de Broken Hill car, après avoir déclaré qu'à son avis, l'*Homo Rhodesiensis*, qui est incontestablement un véritable Néanderthalien, ne peut pas dater du Pléistocène, il dit : " L'Homme de Néanderthal, l'homme de la Rhodésie, la race australienne offrent un fonds commun de caractères primitifs. Malgré les différences qui les séparent, on peut admettre que les trois formes ont une origine commune : elles ont dû se répandre et vivre longtemps sur de vastes territoires. Chez nous, l'Homme de Néanderthal semble disparaître assez brusquement après la période glaciaire, mais peut-être ne s'agit-il pas d'une extinction totale. Il a pu continuer à vivre dans d'autres régions. Il semble bien que l'*Homo Rhodesiensis* nous révèle la persistance en Afrique d'un type humain devenu fossile en France depuis longtemps. Ce type aurait conservé, dans son crâne et dans sa face, les traits primitifs de bestialité, mais il aurait fini, au cours des âges, par acquérir l'attitude parfaitement droite : dans cette direction, il serait plus évolué que son vieux frère d'Europe. On est ainsi amené à penser qu'il a dû survivre longtemps, dans le Continent noir, comme le dernier représentant d'une très vieille forme humaine, d'une forme surannée, au milieu des races noires actuelles, dont plusieurs sont elles-mêmes très archaïques et sur le point de s'éteindre.

" Les caractères physiques et pathologiques du crâne de Broken Hill semblent indiquer que le propriétaire de ce crâne n'est pas mort depuis très longtemps. Et peut-être y a-t-il encore, dans quelque coin inexploré de l'Afrique, des exemplaires vivants de l'*Homo Neanderthalensis* ou de sa variété *Rhodesiensis*. Leur découverte ne serait pas plus extraordinaire que celle faite naguère de l'Okapi, ce grand et curieux

ruminant dont nous connaissons depuis longtemps les ancêtres directs par les ossements extraits des terrains miocènes de l'Europe."

Mais si le type de Néanderthal a subsisté en Afrique, pourquoi n'aurait-il pas pu subsister en Australie ? Et pourquoi n'y aurait-il pas subi l'influence du milieu, comme en Rhodesia, et ne s'y serait-il pas modifié comme l'*Homo Rhodesiensis* s'est modifié en un certain sens puisqu'il aurait acquis l'attitude verticale ? Quand on songe à l'énorme distance qui, dans le temps et dans l'espace, sépare les Australiens néanderthaloïdes de nos Moustériens, on aurait peine à comprendre que le type se fût perpétué en Nouvelle-Hollande sans subir aucune modification. Ce serait la négation de l'influence du milieu, ce que je ne saurais admettre.

On pourra me répondre que, à en juger par sa flore et sa faune archaïques, le milieu australien ne paraît pas avoir subi de profonds changements. C'est ce qui explique précisément que les caractères des tribus du sud n'aient éprouvé que des *atténuations*. Prétendre que les conditions d'existence de ces indigènes soient restées absolument stables et que l'Australien n'ait pas progressé est une hypothèse insoutenable. Certes, il continue à mener la vie errante du chasseur et il fabrique encore des instruments de pierre identiques aux instruments amygdaloïdes de Saint-Acheul : il se confectionne même des massues plus frustes, puisqu'elles consistent en de simples pierres brutes fixées à l'extrémité d'un manche par un bloc de résine : mais il sait polir ses haches, dont certaines sont munies d'une gorge destinée à recevoir l'emmanchure. Il fabrique des corbeilles, habilement tressées, et des paniers en écorce qui, lutés avec de la cire, servent de récipients pour l'eau. Il tisse des pélerines et des frontaux. Il possède des casse-tête en bois de formes variées, des sortes de sabres et des boucliers, également en bois, presque toujours décorés de dessins. Il a inventé le propulseur pour la lance et cette curieuse arme qu'est le boomerang, qui revient à son point de départ si elle n'a pas touché le but. Je ne parle pas des *message-sticks*, puisque John Matthew suppose que les indigènes n'ont fait qu'imiter un procédé dont se servaient quelques Malais arrivés en Australie pour correspondre entre eux, ce qui est d'ailleurs une pure hypothèse. Tout cela dénote que, si arriérés qu'ils soient, les Australiens ont évolué, et qu'ils ne se trouvent plus dans les conditions où étaient placés nos Moustériens en Europe. Il serait incompréhensible que, pendant que leur intelligence progressait, leurs caractères physiques fussent restés immuables. Mais leur évolution a été fort lente et ils ont conservé une assez notable accumulation de traits néanderthaloïdes pour que je les considère, avec M. Boule d'ailleurs, comme issus de la même souche que l'*Homo Neanderthalensis*. Ces traits étant incontestablement nigritiques, il est difficile de se refuser à admettre que cet élément nigritique, qui a joué un rôle en Europe dans la première moitié des temps quaternaires, n'ait légué de son sang à l'Humanité actuelle, notamment aux Australiens du Sud et, apparemment, dans une moindre proportion, à d'autres Mélanésiens. Nous allons rechercher si, dans l'Europe même, on peut encore en retrouver quelques traces de nos jours.

J'ai laissé de côté l'*Eoanthropus dawsoni* et l'*Homo heidelbergensis*, malgré l'intérêt qu'ils présentent, parce que les restes que nous en connaissons se réduisent encore à trop peu de chose. Ils semblent bien indiquer, cependant, qu'avant l'Homme de Néanderthal, il a vécu, dans nos contrées, des êtres qui, tout en offrant des caractères nigritiques, se rapprochaient davantage des Anthropoïdes que les Moustériens.

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S'il me paraît démontré que l'*Homo Neanderthalensis* n'a pas disparu de la surface du globe à une époque fort ancienne, je ne crois pas non plus que, chez nous, il ait disparu "assez brusquement après le période glaciaire" sans laisser de traces de son sang dans les populations qui ont vécu postérieurement en Europe. Sur ce point, je suis de l'avis de beaucoup d'anthropologistes notamment d'A. de Quatrefages et d'E. Hamy. On a découvert, à maintes reprises, dans des sépultures préhistoriques, historiques ou modernes, des crânes qui reproduisent en partie les caractères de la vieille race fossile dont il vient d'être question. Il en existe des spécimens dans un grand nombre de musées et, dès 1882, les auteurs des *Crania ethnica* en avaient décrit et figuré différents exemplaires. Le nombre des observations de ce genre s'accroît constamment. En 1914, par exemple, Verworn a fait connaître deux squelettes trouvés à Obercassel, près de Bonn, dans un foyer de l'âge du Renne : il a noté qu'ils présentaient des ressemblances avec les races de Cro-Magnon et de Chancelade et aussi des caractères néanderthaloïdes.

Les traits qui ont le plus frappé les observateurs sur les crânes dont il s'agit sont, en première ligne, la forte saillie des arcades sourcilières et la fuite du front. Mais souvent, à ces deux caractères s'ajoutent un notable surbaissement de la voûte crânienne qui, en même temps, s'allonge d'avant en arrière et se termine par une sorte de chignon occipital. Parfois, on note encore, dans la face, des orbites de dimensions exagérées. Je ne cite pas, parmi les caractères qu'on observe assez fréquemment chez des Blancs, le prognathisme, dans certains cas très accusé, ni la fuite du menton qui existent chez des individus sans être accompagnés des caractères néanderthaloïdes que je viens d'énumérer. On peut, en effet, les considérer comme un legs d'une autre race fossile dont je parlerai dans un instant.

Comment expliquer la réapparition sporadique, dans les populations modernes de l'Europe, de traits qui caractérisaient l'*Homo Neanderthalensis*? La première pensée qui vienne à l'esprit, c'est de les attribuer à l'atavisme. Mais, dit le professeur Boule, les caractères dont il s'agit sont toujours localisés au crâne : ils n'affectent jamais la face. "En réalité, tous ces Néanderthaloïdes ne sont que des faux Néanderthaliens, c'est-à-dire de véritables *Homo sapiens*, remarquables par la présence accidentelle de quelques traits morphologiques exagérés normalement chez l'Homme de Néanderthal." Selon mon savant collègue, "on peut admettre que les caractères en question sont vraiment primitifs, qu'ils ont fait partie du fonds commun des lointains ancêtres de ces deux espèces" (l'*Homo Neanderthalensis* et l'*Homo sapiens*). S'il faut les attribuer à de lointains ancêtres, les caractères dont il s'agit sont donc

bien des caractères ataviques. Et lorsqu'ils rappellent ceux de l'Homme de Néanderthal, il me semble tout à fait logique de les attribuer à l'ancêtre dont ils étaient la caractéristique.

Assurément les hommes qui reproduisent ces traits ancestraux ne sont pas de vrais Néanderthaliens car l'atavisme ne fait pas réapparaître chez eux l'ensemble des traits de l'Homme de La Chapelle-aux-Saints. Mais on sait que cette force est bien loin de toujours reproduire le type primitif dans son intégrité et que les cas d'atavisme partiel sont infiniment plus fréquents que ceux d'atavisme total. Ce qui est vrai pour un animal quelconque doit être également vrai pour l'être humain. C'est pourquoi je persiste à croire que la réapparition de caractères néanderthaloïdes — même limités à la boîte encéphalique — dénote que l'Homme de Néanderthal a joué un rôle dans la formation de l'Humanité actuelle, non seulement en Australie mais même en Europe. Il mérite donc de figurer dans la lignée ancestrale de l'*Homo sapiens*.

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En dehors de ce type nigrétique bestial, il en est un autre, plus évolué, qui a compté des représentants dans nos contrées dès l'époque quaternaire : c'est le type négroïde auquel j'ai donné le nom de race de Grimaldi, parce que les premiers spécimens de cette race ont été découverts près de la frontière italienne, sur le territoire d'une commune portant ce nom. Je rappellerai en quelques mots l'histoire de cette découverte.

Le 3 juin 1901, au cours des fouilles que le Prince de Monaco faisait exécuter dans les fameuses grottes des Baoussé-Roussé, près de Menton, le chanoine de Ville-neuve, qui dirigeait les travaux pratiqués avec un soin méticuleux par F. Lorenzi, se trouva en présence de deux squelettes humains qui gisaient à 8 m. 50 de profondeur, immédiatement au-dessus de dépôts contenant des restes de Rhinocéros de Merck. Les couches supérieures ayant été reconnues parfaitement intactes, la haute antiquité de ces squelettes était indiscutable. On les fit remonter d'abord à l'époque du Moustier, ce qui les faisait contemporains de l'Homme de Néanderthal. Cette contemporanéité fournissait un argument aux savants qui prétendent qu'il faut exclure l'*Homo Neanderthalensis* de notre lignée ancestrale. Les Négroïdes de Grimaldi, disaient-ils, appartiennent à l'espèce *Homo sapiens* : or, s'ils ont vécu sur notre sol en même temps que les Moustériens, il est clair qu'ils ne sauraient être regardés comme leurs descendants. Ils omettaient d'envisager une hypothèse que j'examinerai plus loin et dont ils sont devenus les plus chauds partisans, à savoir que le type de Grimaldi a pu venir du dehors. Dans cette hypothèse, les ancêtres de nos Négroïdes, vivant dans un milieu différent de celui où se trouvaient les Moustériens, auraient fort bien pu évoluer pendant que ceux-ci conservaient leurs caractères archaïques.

Mais, il a fallu rajeunir un peu les squelettes des Baoussé-Roussé. Ils gisaient dans une fosse de 0 m. 75 environ de profondeur, et il est évident qu'ils ne sont pas

du même âge que la couche dans laquelle ils ont été ensevelis ; en outre, l'industrie qui les accompagnait est aurignacienne. Évaluer le temps qui s'est écoulé entre l'époque où vivait l'Homme de Néanderthal et celle où ils vivaient eux-mêmes, dans le milieu spécial que leur offraient les rives de la Méditerranée, me semble fort difficile.

Lorsque j'ai décrit avec détails les caractères du type de Grimaldi, quelques critiques ont été formulées, mais bientôt la presque unanimité des anthropologistes s'est rangée à mon opinion. Je n'ai pas besoin de rappeler que les deux squelettes des Baoussé-Roussé ont appartenu, l'un à une vieille femme, l'autre à un adolescent de sexe masculin. Malgré la différence d'âge et de sexe, ils présentent une uniformité de caractères extrêmement frappante. Il s'agit d'une race d'une taille un peu supérieure à la moyenne, possédant un avant-bras très long par rapport au bras, une jambe très longue par rapport à la cuisse, et un membre inférieur relativement fort allongé comparativement au membre supérieur. Par les indices qui traduisent ces caractères, ils exagèrent les traits que Broca a attribués à la moyenne des Nègres. Leur bassin, très allongé d'avant en arrière, très étroit et très développé dans le sens vertical, est un véritable bassin nigrétique. Sur certains de leurs os longs, on note même des caractères qui s'observent chez l'Homme de Néanderthal et chez les Anthropoïdes.

Il m'a fallu reconstituer les crânes qui avaient été fortement aplatis transversalement. La boîte encéphalique a été reconstituée d'une façon assez satisfaisante pour qu'on puisse avoir confiance dans les diamètres. Par crainte de la briser, je n'ai pas osé toucher à la face de ces deux précieux sujets, mais ce que je n'ai pas osé faire sur les pièces originales, je l'ai tenté sur un moulage de l'une d'elles. D'ailleurs, même dans l'état où elles se trouvent, elles permettent d'en apprécier aisément les caractères.

La tête est fortement dysharmonique, le crâne étant hyperdolichocéphale et la face basse. Elle est notablement développée verticalement dans sa portion encéphalique qui, vue d'en haut, affecte une forme elliptique régulière. Sur le profil, on observe la régularité de la courbe antéro-postérieure, sauf un léger méplat dans la région postérieure des pariétaux et un renflement bien prononcé de l'écaille occipitale. Les parois latérales de la boîte crânienne sont verticales et parallèles. En raison de la saillie des arcades zygomatiques, les fosses temporales offrent une notable profondeur. Les sinus frontaux sont assez volumineux, mais la saillie qu'ils impriment à la portion interne des arcades sourcilières s'atténue progressivement et s'efface à peu près totalement dans sa partie externe. Je n'insisterai pas sur les caractères du crâne parce qu'on peut les reconstruire aussi bien chez les Blancs que chez les Nègres.

Il n'en est plus de même quand on passe à l'examen de la face, qui offre tout un ensemble de traits caractéristiques du Nègre. Quoique basse, cette face se projette tellement en avant que l'angle alvéolaire tombe à 60°. Les orbites, larges en comparaison de leur hauteur, comme tout le visage, avec des angles peu atténués et

un bord inférieur extroversé, ont moins de valeur comme élément de diagnostic. En revanche, le nez, déprimé à sa racine, devient tellement large que son indice atteint 63,63 chez la vieille femme. Chez le jeune homme, j'ai trouvé un chiffre moins élevé, franchement platyrrhinien cependant (51,35), qui est d'ailleurs inférieur à la réalité, car la reconstitution laisse à désirer en ce point. Le plancher des fosses nasales, extrêmement déclive en avant, se continue, sans ligne de démarcation nette, avec la face antérieure des maxillaires supérieurs, en formant une vaste gouttière de chaque côté de l'épine. La voûte palatine est remarquable par sa profondeur et par la tendance au parallélisme des bords qui la limitent.

Par suite de la chute d'une grande partie de la dentition, la mandibule de la vieille femme s'est atrophiée, mais celle de l'adolescent est d'une remarquable robusticité : au niveau de la 2^e molaire, elle mesure 18 millimètres d'épaisseur, chiffres que n'atteignent pas diverses mandibules néanderthaliennes. La branche montante est large, basse, avec des apophyses coronoïdes robustes et des condyles fortement obliques en arrière. Les échancrures sigmoïdes sont profondes. Le prognathisme mandibulaire est énorme, le menton plus fuyant que chez la plupart des Australiens, et la dentition aussi primitive que chez ceux-ci par le volume des dents, le nombre et le développement des cuspidés des molaires.

En présence de tant de caractères franchement nigrétiques, dont quelques-uns rappellent même ceux de l'*Homo Neanderthalensis*, il fallait bien reconnaître qu'à un moment de la période quaternaire, des individus négroïdes avaient vécu sur notre sol. Mais on pouvait se demander si les deux sujets des Baoussé-Roussé n'étaient pas des Nègres, arrivés là accidentellement et disparus sans avoir exercé aucune influence en Europe. Les recherches auxquelles je me suis livré pour élucider ce problème m'ont fait découvrir, dans plusieurs musées de l'Italie septentrionale, des crânes modernes offrant des caractères rappelant incontestablement ceux de la race de Grimaldi. J'ai même rencontré deux sujets vivants, originaires d'un coin des Alpes Grées où il est difficile de supposer que des Nègres soient arrivés à une époque récente, qui présentaient un bon nombre des caractères céphaliques des Négroïdes des Baoussé-Roussé.

Une fois l'attention attirée sur ce point, les observations se sont multipliées. On a trouvé des restes osseux de Négroïdes dans des collections de la France, de la Suisse, de l'Italie, du Nord de l'Afrique. Les uns dateraient du Paléolithique supérieur (série de crânes des abris de La Mouillah, frontière algérienne de l'Ouest), les autres, des escargotières de Tebessa, dont l'âge est discuté, d'autres du Néolithique inférieur de la province d'Oran. Dans l'Afrique du Nord, l'élément négroïde aurait formé le substratum ethnique de toute la Berbérie. En Europe, nous le retrouvons à l'époque néolithique en Bretagne, en Suisse, en Illyrie, dans les Balkans, etc., à l'âge du bronze et au premier âge du fer en Suisse, dans l'Italie septentrionale, etc. Il est assez plausible d'attribuer à de l'atavisme le prognathisme, souvent très prononcé, et la fuite du menton qu'on observe de nos jours chez certaines personnes, qui

ne présentent d'ailleurs pas de caractères nigritiques dans la chevelure ni dans la coloration de la peau. Ainsi que je l'ai écrit en 1906, " pour qu'on découvre encore aujourd'hui tant de traces d'un type ethnique à caractères rappelant ceux que j'ai observés sur la race de Grimaldi, il a fallu forcément que cette race fût représentée autrefois, dans nos contrées par tout un groupe." Je pourrais ajouter actuellement que le même type a dû être également largement représenté dans l'Afrique du Nord.

Une nouvelle question se pose : quel a été le point de départ de cette race ? Le professeur Boule n'hésite pas à répondre : " Les Négroïdes de Grimaldi sont sûrement des Africains." Je le veux bien, mais il me sera permis, néanmoins, de faire une simple remarque : jusqu'ici, on n'a signalé le type en Afrique qu'à une époque plus récente que celle où vivaient nos sujets des Baoussé-Roussé. Je n'ignore pas que ce n'est pas dans le Nord du continent africain qu'on veut retrouver les frères de nos Négroïdes, mais à l'extrémité sud de ce continent, chez les Boschimans, auxquels il est impossible, dans l'état actuel de nos connaissances, d'assigner, avec quelque certitude, une très haute antiquité. Les arguments qu'invoquent les partisans de cette théorie sont de deux sortes : les uns sont basés sur les caractères physiques, les autres reposent sur certaines particularités morphologiques observées sur des statuettes de l'époque aurignaciennes. Je ne puis accepter ni les uns ni les autres.

Comme caractères communs aux Négroïdes de Grimaldi et aux Boschimans, on cite la dolichocéphalie, le prognathisme, la largeur de la face et celle du nez, la forme de la mandibule et la grosseur des dents. Ces caractères se retrouvent dans d'autres races nègres que les Boschimans et ne suffisent pas pour justifier le rapprochement établi. D'ailleurs, il ne s'agit que de vagues ressemblances. Quand on examine de plus près la morphologie faciale, on constate de grandes différences : les orbites sont mésosèmes chez les Boschimans et très microsèmes chez les Négroïdes : le nez, à charpente sans relief, à peine déprimé à la racine, avec une ouverture triangulaire chez les premiers, a une charpente en relief, une dépression notable à la racine et une ouverture de forme très différente chez les seconds : si la face est large dans les deux types, les pommettes ne se ressemblent nullement : aucune comparaison n'est possible entre les mandibules qui, chez nos Négroïdes, sont notamment caractérisées par la fuite du menton, tandis que chez les Boschimans le menton est petit, mais proéminent. Deux caractères auxquels on ne semble pas attacher d'importance et qui, pour moi, présentent un incontestable intérêt lorsqu'on établit un parallèle entre les deux groupes, sont la taille et la forme du crâne. Les Négroïdes sont d'une taille un peu au-dessus de la moyenne et ont le crâne remarquablement développé dans le sens vertical : les Boschimans sont des Pygmées et ont le crâne notablement surbaissé.

Quant aux arguments tirés des statuettes aurignaciennes, ils sont aussi peu convaincants ; ils sont basés, en somme, sur la stéatopygie, et, pour quelques-unes de ces statuettes, sur le développement des nymphes. On ne me fera pas admettre que les artistes quaternaires, qui ont représenté avec tant de fidélité certains animaux,

mais qui, de l'aveu unanime, se sont montrés si inhabiles quand ils ont figuré les êtres humains, nous aient légué des *portraits*. Les têtes des statuettes sont à peine ébauchées, les traits du visage ne le sont même pas du tout, sauf sur la "figurine à la capuche" de Piette, où ils sont rendus d'une façon si grossière qu'on n'en peut tirer aucun parti. Le thorax, sur la "reine des Vénus aurignaciennes" a des dimensions antéro-postérieures dépassant à peine la moitié du diamètre longitudinal de la tête, et les énormes seins de la même femme naissent à la ceinture pour retomber sur le ventre. Lorsque les membres supérieurs et intérieurs sont figurés, ils offrent des proportions absolument grotesques. Bref, ces statuettes, dont l'intérêt au point de vue de l'évolution de l'art est indéniable, ne sont que des caricatures.

Je ne dirai rien des nymphes, qu'il faut parfois beaucoup de bonne volonté pour découvrir, et j'admettrai que les artistes aient rendu avec exactitude un caractère qui les avait frappés : la grande accumulation de graisse dans les régions des fesses et des hanches. Ce caractère, à mon sens, n'a nullement la valeur qu'on a voulu lui attribuer, et voici pourquoi : il n'est nullement l'apanage exclusif des femmes boschimanès. En laissant de côté les femmes d'autres populations de l'Afrique australe qui sont atteintes de stéatopygie, et les femmes boërs, chez lesquelles, dit-on, le caractère apparaît lorsqu'elles descendent de familles établies depuis longtemps dans le pays, le Général Faidherbe m'a affirmé qu'il l'avait observé chez des Nègres du Sénégal qui n'avaient rien à voir avec les Boschimanès. Moi-même, au cours de ma carrière médicale, j'ai rencontré quelques cas de véritable stéatopygie chez des Parisiennes. Ce n'est donc pas un caractère suffisant pour faire d'une femme la sœur de la "Vénus hottentote."

* * * * *

En résumé, la division de l'Humanité en deux espèces entièrement distinctes, l'*Homo Neanderthalensis* et l'*Homo sapiens*, la première éteinte depuis longtemps sans avoir laissé de traces, ne me paraît pas justifiée. Les caractères des Australiens néanderthaloïdes indiquent une parenté très étroite avec nos Moustériens ; d'autre part, certains traits observés sur des crânes néolithiques ou récents d'Europe s'expliquent par l'atavisme. La race de Néanderthal, foncièrement nigritique, a continué à jouer un rôle chez nous, de même qu'en Afrique, en Australie et ailleurs. Des observations faites sur des squelettes pléistocènes de Wadjak et de mounds du Nebraska me portent à croire que le même élément est intervenu dans l'ethnologie de Java et du Nouveau Monde.

Pour le type de Grimaldi, le doute n'est guère possible. En Europe, on en suit les traces, presque pas à pas, depuis l'époque aurignacienne jusqu'à nos jours. Dans l'Afrique du Nord, son existence est non moins évidente, quoiqu'il ne soit pas possible de préciser l'époque où il y a fait son apparition.

Un autre élément nigritique -- l'élément papoua -- vient d'être signalé au Tonkin par H. Mansuy dans des gisements qui nous reportent à une période néolithique extrêmement archaïque. Dès 1879, A. de Quatrefages en avait observé les caractères sur un

crâne fossile d'une grotte située près de Lagoa Santa, au Brésil. P. Rivet l'a retrouvé assez largement représenté, dans les abris sous roches de Paltacalo, en Équateur, et chez les Péricués, tribu disparue de la Basse-Californie que H. Ten Kate avait déjà reconnue comme sûrement apparentée aux Mélanésiens. Je viens moi-même de constater l'existence de ce type très caractérisé chez les Tunebos des hauts plateaux de la Colombie. Depuis la Californie jusqu'à l'extrême Sud de l'Amérique, l'élément nigritique paraît avoir joué, dans le passé, un rôle assez important pour avoir laissé partout ses traces.

De tous ces faits, j'en arrive à déduire que l'Humanité a été représentée à l'origine par un ou plusieurs types nigritiques d'une grande bestialité, possédant encore des caractères simiens. Ces éléments primitifs ont évolué et ont donné naissance aux grands types nègres actuels, africains et mélanésiens. L'évolution a été progressive, et la preuve nous en est fournie, à mon sens, par les intermédiaires découverts à Talgai et à Wadjak. Ces types intermédiaires, placés dans des conditions spéciales, ont pu se perpétuer jusqu'à nos jours (chez les Australiens non néanderthaloïdes et certains Néo-Calédoniens, par exemple) tout en ayant évolué quelque peu. Nos Négroïdes de Grimaldi s'écartent trop de l'Homme de Néanderthal pour qu'on puisse supposer qu'ils en soient issus directement, surtout si le temps qui les sépare est relativement peu considérable. Où ce type nouveau a-t-il pu se constituer? je l'ignore. A priori, on songe à l'Afrique, mais comme je l'ai fait remarquer, les Négroïdes du Nord-Africain paraissent plus récents que nos sujets des Baoussé-Roussé.

Les conclusions qui se dégagent de cette étude peuvent se résumer en quelques lignes :

1° L'Humanité primitive présentait des caractères simiens dénotant une parenté avec les Anthropoïdes. Ce type archaïque ne s'est pas éteint : il a évolué plus ou moins suivant les milieux. Ses traces, très clairsemées en Europe, sont bien manifestes dans l'Australie du Sud.

2° A ce type primitif, a succédé un type plus évolué chez lequel les caractères simiens ont peu à peu disparu, mais qui a conservé des traits nigritiques fort accusés. S'il ne joue plus chez nous qu'un rôle très effacé, il n'en est pas de même dans d'autres parties du monde.

3° Les récentes découvertes font supposer que, partout, l'élément nigritique a précédé les races jaunes et blanches.

Certes il existe encore trop de lacunes dans nos connaissances pour qu'il soit possible de suivre pas à pas l'évolution de l'être humain dans le temps et dans l'espace. Il nous manque des intermédiaires pour établir la filiation des races. Toutefois, ma conception me semble plus en accord avec les faits que celle qui consiste à admettre un hiatus entre l'Humanité primitive et l'Humanité actuelle.

MARITAL GERONTOCRACY IN AFRICA.

By B. Z. SELIGMAN.

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INTRODUCTION.

SOCIAL and economic factors of sufficient strength to modify the direct action of an instinctive force must always be of great interest to the sociologist and the anthropologist. Arranged marriages, that is to say, marriages arranged by parents or elders and prompted by other reasons than that of mutual personal attraction, are common enough, yet in each society they present separate problems: the typical French marriage is the outcome of quite different conditions to those in force in the East, where marriages are also arranged by parents or elders and not by the couple concerned.

A certain type of marriage is widely distributed among peoples of the ruder cultures. This type of marriage is not arranged by parents, elders, or go-betweens, but is the result of social tradition. A man has a right to marry a woman who stands to him in a certain definite relationship. The most common marriage of this kind is that known as the cross-cousin marriage: another form of marriage spreading now with the propagation of Islam is that of the ortho-cousin.¹

Another type of traditional marriage of peculiar interest is that with the classificatory granddaughter and, closely associated with this, marriage with the classificatory grandmother. The special psychological interest in these forms of marriage is that, not only do they run counter to free sexual selection of the most attractive partner (as do all arranged marriages), but they impose a condition which is normally antipathetic to mutual attraction—*i.e.* a disparity in age. As will be explained later, in the societies where this type of marriage is prevalent the disparity is not so great

¹ Cf., e.g., Frazer, *Folklore in the Old Testament*, chap. vi. Rivers, *The History of the Melanesian Society*. Westermarck, *History of Human Marriage*, especially chapters xviii and xix. B. Z. Seligman, *Studies in Semitic Kinship*, part ii: "Cousin Marriage." *Bulletin of the School of Oriental Studies*, vol. iii, part ii, 1924. "African Relationships," *Man*, April, 1917.

as it would be among ourselves, and sometimes need not exist at all. Yet, at the time when the granddaughter marriage first became an institution, the disparity must have existed. However important the bearing of the (Edipus complex (as demonstrated by the psycho-analysts) may be on the ultimate love-choice of persons whose childish attitude has undergone fixation, the normal mature individual is sexually attracted to someone of approximately the same age. That is to say, females maturing earlier than males, youths marry girls two or three years younger than themselves, when economic pressure does not prevent early marriages. That this is true also of the sexual attraction, quite apart from the question of marriage, is seen in the pre-marital love practices, so common among "savages," where girls and boys congregate in the "bachelor houses." Yet in spite of this the positive attraction of immature girls for elderly men and of mature women for immature boys must be recognized, as well as the more normal and more biologically important mutual attraction of men and women of similar age, and it should be noted that of the unequal types of love-choice that of the youth for the mature woman does not lead to marriage in anything like the proportion that is found in the reverse condition, either among ourselves or among savages. Yet the fact of the acceptability, as a partner, of an older woman by a young man must be granted in the habitual marriage of a man with his classificatory grandmother. However, I hope to show later that this marriage with the grandmother is only a corollary of the marriage of a man with his granddaughter, and therefore cannot be directly the outcome of the (Edipus complex—that is to say, it is not due to cravings of an immature youth for a woman resembling his own mother. In order to throw light on this point, before discussing the marriage between persons separated by two generations, let us first consider those states of society where it is permissible for old men to marry young girls, quite apart from any definite right to do so. Important chiefs in Africa are able to marry large numbers of young girls, and wealthy Muhammedans to take very young brides. Definite knowledge on the subject gained from the young brides themselves is wanting, but all the circumstantial evidence points to the fact that they are unwilling partners. They must be guarded with care, yet young lovers are frequently taken, and where economic conditions favour the marrying of young brides by old men it is the outcome of the desire of older men for younger partners and is by no means reciprocal. From the woman's point of view, marriage of the types under consideration in this paper cannot be looked upon as due to the choice of women of partners in whom the (Edipus complex can be realized. If, then, the marriage between persons separated by two generations be not due to mutual sexual attraction, we may well ask how it arose. In examining the cases where this remarkable form of marriage exists in Africa I have attempted to show its social importance and suggest the possible lines of its history.

I have considered these two types of marriage as associated with the idea of women as property, and I have ascribed them to the power of the old men, which

may conveniently be termed Gerontocracy, *i.e.*, a constitution of society dependant on the dominance of the old men, as found in Australian society, and first described by Rivers by this term. So among the Dieri a man marries the granddaughter of his brother, and, in Melanesia, Rivers found various indications both of this marriage and that with wife of the grandfather. In Melanesia, however, the actual occurrence of marriages separated by two generations is rare, but, from the evidence of kinship nomenclature, Rivers inferred that there had been an ancient institution in which the dominance of the old men was normally associated with this type of marriage. "We have no record of any dominance of elders in Melanesia such as seems to exist in Australia, but the most natural way of explaining the granddaughter marriage is by the supposition that at one time such dominance not only existed in Melanesia, but reached a pitch far surpassing anything that has been recorded in Australia, a dominance so great that the elders were able to monopolize all the young women of the community, the young women of each moiety becoming as a matter of course the wives of the elders of the other moiety. My first supposition, then, is that the marriage with the daughter's daughter is the immediate and natural result of the monopoly by the old men of all the young women of the community.

As I have already mentioned, the obvious consequence of such a condition is that, as young men grow up, they will find the young women who would naturally have been their wives already appropriated by the old men. Their only chance of obtaining wives will be that women may be given to them who have already been the wives of their elders."¹

As will be seen in the following pages, I do not make any such general supposition with regard to gerontocracy in Africa, but suggest that marital gerontocracy arose as the result of a certain type of culture contact. My reason for this is, that among those tribes to which I have ascribed the custom of marital gerontocracy, in Africa the evidence for it is very definite, far more so than is the case in Melanesia, yet, in large areas, where we know rather more of the social conditions than in those under discussion, there is no evidence for previous marital gerontocracy.²

Before examining the African evidence for marital gerontocracy I must make my opinion clear with regard to the individual and classificatory use of kinship terms. I have for some time been coming to the conclusion that the fundamental human relationship between parent and child has never been obliterated by the recognition of classificatory kinship. Thus I have reached a standpoint somewhat similar to that of my friend Dr. Malinowski.³ In considering the marriage of persons separated by two generations it might be necessary to distinguish between "own

¹ Rivers, *History of Melanesian Society*, vol. ii, p. 59.

² I refer especially to the works of Roscoe, Driberg, Hollis, Hopley, Dundas, and C. G. and B. Z. Seligman in Uganda, Kenya and the Sudan.

³ Dr. Malinowski has kindly read this article, and I owe much to the numerous discussions on kinship that I have had with him.

grandchildren" and "classificatory grandchildren." Such a distinction would obviously be important in a patriarchal family, where the own grandchildren of the son are brought up in the household of the patriarch. But in matrilineal society it is probable that the distinction between own grandchildren and classificatory grandchildren would be less important, and, as will be seen later, I have supposed the custom to have crystallized among predominantly matrilineal people. Thus, when the custom of marrying the granddaughter arose, marriage may have been equally permissible with the own grandchild as with the grandchild of a brother. It will be noticed that among the Wa Yao marriage is allowed with the own grandchild, while among the Ba Kaonde and the Ba Ila it is permitted with the granddaughter of the brother.

Objections have been made to deducing marriage customs from the study of kinship terms.¹ But surely it would be a complete denial of the comparative method to reject conclusions based on these observations as worthless because they are founded on linguistic data. Language alone, because of its elasticity, would be an unsafe guide, though often a helpful indicator, to social usage. But when, as in this case, the terms are the expression of a social usage actually existing in some tribes, and these terms, but not the custom, exist among other tribes, while among others one element of the custom exists with terms which indicate a fuller extension of this custom, then there seems little that any exponent of the comparative method can fail to accept. Yet it is the very supporters of the comparative method who make such strong objections to deductions made from linguistic data when they are used for historical rather than psychological reconstruction. Again, it might be objected that in systems like that of the Wahenga, where there are so few kinship terms, "wife" simply means woman. This is obviously true, yet "my woman" means something quite different from "a woman." If this were not so, why can "my woman" be used as a term of address to certain women and not to certain others, *i.e.* the mother, the sister, and the mother-in-law? In Germany there is only one man whom a woman can call "my man," yet no doubt of the special meaning of "my man" can be felt after hearing a German woman speak of "mein Mann." Thus among the Wahenga "wife" means "my woman, whom I have married," or who is mine to marry if circumstances be favourable. There are other definite terms for those women with whom marriage would never be permitted.

Though I think there can now be no doubt that marriage with the granddaughter, both in the ordinary and the classificatory sense of the term, and with the grandmother in the classificatory sense, does take place in Africa, I am far from suggesting that the task of the anthropologist has ended in establishing these facts and speculating on their origin. A detailed and intimate account of the social organization and family life of one of the tribes where these marriages are allowed would be of the

¹ Westermarck, *History of Human Marriage*, especially vol. i. chap. vii.

greatest importance. We should learn how frequently these rights were exercised, whether they superseded the action of free selection, or were only resorted to in the last resource. We should need to enquire into the effect of this marriage on the respect generally paid to elders; how it affects the mental attitude of a boy to call his grandfather "companion," and of a little girl to know that she was the probable wife of her grandfather: or, again, for a small boy to know that his grandmothers were his possible wives, and for a woman to see husbands born to her in the sons of her children. Would such conditions affect the children's games and early pre-marital sexual relationships, since among the ruder peoples such activities are not checked? Then, again, it would be interesting to see the effect on the individuals in a family where these marriages had taken place, and compare them with others in which, though recognized as legal, such unions had not occurred. Thus we should be able to compare both the "family" and "the clan" or "classificatory" attitude to these anomalous marriages.

THE EVIDENCE FOR MARITAL GERONTOCRACY IN AFRICA.

Evidence for marital gerontocracy in certain areas of Africa has been accumulating recently. In some cases the custom of actual marriage with a grandchild is not observed to-day, but clear indication of the practice is seen in the use of kinship terms, while among other peoples the marriage is customary or at least legal. Among the Ba Ila of Northern Rhodesia a man addresses all granddaughters as "wife" and a woman all grandsons as "husband." To some of these potential wives a man has free access, while others he may not marry and has no rights over them.¹ The wives of all those whom a Ba-Ila calls "grandson" are called wives and may freely be treated as such. Further, a man calls "all his collateral grandmothers on

¹ Smith and Dale, *The Ila-Speaking Peoples of Northern Rhodesia*, vol. i: "In regard to the grandchildren . . . I being a male address my granddaughter as *mwinaungu* ('my wife'). . . . This does not now mean that I may marry them [her] or that I have any rights whatever over their [her] person," appears on p. 321, while on p. 339 the following appears:—"Between me and the collateral grandmothers on my own side there is no taboo: I address each of them as *mwinaungu* ('my wife'), and may treat her as such. Similarly there is the same liberty between me and my 'grandchildren,' whom I call *bemungu* ('my wives'). This is only an extension of the principle that my collateral grandfather's property is mine potentially: I may enter my grandfather's brother's village, spear his oxen or rob his fields with impunity."

The passage is obscure: it is not clear what is meant by collateral grandmothers, but I assume it to mean classificatory grandmothers. "Grandmothers of my own side" might mean my mother's mother's sisters, or my father's father's sisters, or even my father's father's brother's wives or mother's father's brother's wives.

As the Ba Ila are matrilineal and have exogamous totems, it is clear that a man's daughter's daughters must be a different totem to himself, and so could be marriageable, while his sons' daughters might belong to his own totem, and so could not be married. His brother's grandchildren would be as his own grandchildren, but his sister's grandchildren would be of the same totem as himself, and so presumably not marriageable, as among the Ba Kaonde.

his own side "wife,"¹ and has the right to treat them as wives. His grandson he addresses as "my friend."

Among the Wa Yao of Nyassaland a female grandchild, the child of either son or daughter, is called "wife," and all grandsons are addressed as "younger brother," as are the husbands of the granddaughters. A man can marry the daughter of a daughter or the daughter of a son, but not both: he would not marry his grandchild while her own grandmother, his wife, was still living. A man can marry his great-granddaughter if he has not already married her mother. Dr. Meredith Sanderson writes: "It is legal, though rare, for a man to marry the daughter of his own child."² Perhaps the marriage with the grandchild is not so rare as Dr. Meredith Sanderson first considered. I will quote from a letter he wrote me, dated September 4th, 1921. He stated that one of his informants had married his great-granddaughter and that this fact had altered this man's individual use of kinship terms: he addressed his grandson as "father-in-law" because he had married his daughter. Further, he writes: "The reason given for calling the husband of a granddaughter 'brother' (*mpirako*, 'one's younger brother') is that 'he has taken one's place' as husband of one's potential wife."

"A grandson is sometimes, though rarely, called *alumu* (wife's brother), evidently because he is the 'brother of a potential wife.'"

"The fact that a great-grandchild is called 'son' or 'daughter' suggests that marriage with a granddaughter is more usual (perhaps more ancient) than that with a great-granddaughter. All the terms used for this class of relationship support this."

Marriage with the grandchild is clearly indicated in the kinship terms collected by Dr. Meredith Sanderson among the Wangonde and Wahenga, and published in this *Journal*.³ It is not practised among either tribe, nor has it been permitted within living memory. Yet among the Wangonde a man calls all granddaughters, the daughters of either the son or the daughter, *nkasi* (wife). All the wives of all the classificatory grandsons and grandfathers are also called "wife," but *not* the classificatory granddaughters of a wife. The wives of the classificatory grandsons of a wife and the classificatory grandmothers of a wife are also called "wife." Similarly, a woman calls all grandsons "husband," and also the husbands of classificatory granddaughters and grandmothers, the husbands of all classificatory granddaughters of her husband, but *not* the classificatory grandsons of her husband nor the classificatory grandfathers of her husband.

Among the Wahenga a man calls his granddaughter *mwali* (wife) and a woman calls her grandson *mfumu* (husband). The wives of classificatory grandsons, including those of the wife, all grandmothers and those of the wife, are called "wife" by a man.

¹ Cf. footnote, p. 235.

² *J.R.A.I.*, vol. l. 1920, "Relationships among the Wa Yao," p. 374.

³ *J.R.A.I.*, vol. liii, 1923, p. 448.

Similarly, all classificatory grandsons and those of the husband, husbands of all classificatory granddaughters, and all grandfathers, are called "husband" by a woman.

The use of the terms *mwĩmangu* and *manyane* are equally instructive: they mean "compeer" among the Wangonde and Wahenga respectively.

"*Mwĩmangu* . . . When coupled to a term of relationship it has the meaning of 'fellow,' e.g., *nkasi-mwĩmangu*, 'my fellow-wife': or it indicates an absence of formality in intercourse with that degree of relationship. Thus *mwĩsukulu-mwĩmangu* [reciprocal grand-compeer] is always used in preference to *mwĩsukulu* by itself, and indicates that a grandson is treated as a 'brother,' a younger 'brother,' but an equal.

"*Nkasi-mwĩmangu* ('my fellow-wife') is the . . . term used by a woman for the wife of a potential husband, but it is not generally used among the potential wives of a man, as such. The actual wives of a man, however, refer to each other by means of this term, and to their husband's potential wives.

"*Manyane* . . . This term may be used either by itself or suffixed to various terms of relationship: alone it means merely 'a companion,' without much reference to seniority either in rank or age, except that it would not be used by a junior to a senior. In conjunction with terms of relationship, it definitely implies equality and absence of formality in intercourse: with reference to one of the same generation as the speaker it indicates community of relationship, e.g., *muwoli-manyane*, 'my fellow-wife'; used of one belonging to the second generation above or below that of the speaker it implies that those classes are regarded as equals.

"*Muwoli-manyane* ('my fellow-wife') is used by a woman to denote the wife of her potential husband and the potential wives of her husband."¹

However, should anyone still doubt that the use of the term "wife" indicates that this person is or was in the past a potential wife, the use of the term *marĩhamsi* by the Wangonde should convince him. This word means "marry with us," and is used of the paramour of a wife, but it is also applied, usually with the addition *mwĩmangu* (compeer) in order to avoid any opprobrium, to the husband of a potential wife.²

Among the Ba Kaonde a man may marry his brother's son's daughter and his brother's daughter's daughter, also his sister's son's daughter, but not his sister's daughter's daughter. No mention is made of a man's own son's daughter or daughter's daughter either in the list of prohibited or permitted marriages.³ The relationship terms are not given, so we have no means of knowing whether the same term is used for own grandchild and the grandchild of a brother or sister. The Ba Kaonde

¹ Meredith Sanderson, "The Relationship Systems of the Wangonde and Wahenga Tribes, Nyassaland," *J.R.A.I.*, vol. liii, 1923.

² Meredith Sanderson, *loc. cit.*

³ Melland, *The Witch-Bound Africa*, 1923, p. 63.

are matrilineal, and it is clear that the classificatory grandchildren with whom marriage is permitted are those who are "unrelated" to a matrilineal people.

Possibly, rights over the granddaughter may exist among the Akamba, for Mr. Dundas writes that in Kyambu a man may claim the whole of the dowry of his daughter's daughter.¹ If such a right is general, it may mean that the grandfather takes the bride-price in lieu of the granddaughter in marriage. However, individual cases of claiming the bride-price may have an entirely different meaning.²

When we turn to West Africa we have further evidence of granddaughter marriage. Mr. C. K. Meek has kindly placed at my disposal his notes, as yet unpublished. The Gbari, a tribe speaking a Sudanic language, address all granddaughters as "wife," and the husbands of the granddaughters by a word which means wife-stealer. A woman calls her granddaughters "fellow-wife," that is by the term used between two women, the wives of the same man, and the granddaughters all address their father's mother as "fellow-wife." Granddaughter marriage is not allowed, but a man may marry the widows of his maternal and paternal grandfather, but not the mother of either of his parents. Here, as among the Wangonde and Wahenga, the significance of the terminology is evident.

Captain Rattray records the horror with which men regarded the marriage of a man with a great-granddaughter among the Ashanti; a great-grandchild is called "grandchild don't touch my ear." The touch on the ear by a grandchild is said to cause speedy death.³ Marriage with the grandchild is not allowed, but the fact that the ear is an erotically sensitive area, and that a touch on it by this relative is recognized as particularly dangerous, must imply some special reason for keeping these relatives apart, and it is suggested that this prohibition indicates a change in custom, and that marriage was previously permitted.⁴

We must now turn to the evidence for marriage with the grandmother. It must be realized that with classificatory kinship this marriage does not present the incongruous situation that it would among a people with "family" kinship.⁵ According to the "family" kinship system, the grandmother must actually have given birth

¹ Dundas, "Organization and Laws of some Bantu Tribes of East Africa," *J.R.A.I.*, vol. xlv, p. 286.

² Thus among the Bari I found that in certain cases a man could claim the bride-price of his sister's daughter. This was only done during a period of dearth of cattle, when the mother had been taken without payment, which was merely deferred until the daughter was born and then made to the woman's brother instead of to her father. The Bari are not matrilineal.

³ R. S. Rattray, *Ashanti*, 1923, p. 39.

⁴ On the other hand, the prohibition may be older and may date back to the time when marriage with the granddaughter was allowed; if marriage were allowed with the granddaughter, then the avoidance with the great-granddaughter may have been considered necessary owing to the strong feeling that sexual connection with a mother and daughter is wrong. This feeling probably lies at the back of all "savage" mother-in-law avoidance.

⁵ I adopt Rivers' terminology of "family" rather than Morgan's "descriptive" for our own system of kinship.

to one or other of the parents. So that not only when a man is old enough to marry would his grandmother be sexually unattractive and past child bearing, but the idea of incest is firmly attached to connection with the parent of the parent, as it is to the mother herself. The likelihood of attraction to the grandmother seems so remote that the prohibition in the English Prayer Book appears unnecessary. The absurdity of the prohibition disappears if it be agreed that the Semites themselves once possessed the classificatory system,¹ or were acquainted with peoples still using it.

According to the classificatory system, the "grandmother" may be any wife of the "grandfather" and any wife of any man whom the grandfather may call "brother," also any "sister" of the grandmother. When the question of marriage with the "grandmother" arises, the actual mother of the mother would always be excluded among matrilineal peoples, so that the idea of incest, extended from and comparable to our idea of incest with the parent, does not present itself. There is no need to postulate any great disparity of age between a man and his classificatory "grandmother." If the old men have the right to marry their children's daughters, as we have seen above, many of the grandfather's wives will be young women. Also there may often be great disparity in age between a classificatory "brother and sister," so that even where the "grandmothers" are not "granddaughter-wives" they are not necessarily older than their classificatory "grandsons."

Among the Ba Ila, the Wangonde and the Wahenga, the "grandmothers" are addressed as wives, and certain of the grandmothers are treated as wives among the Ba Ila.²

Among the Wangonde "a man often has to marry the grandmothers, though the heir would take them if the grandfather were rich or influential"³ Unfortunately Dr. Meredith Sanderson has not told us under what conditions a man marries his grandmothers; it is clear they are not usually inherited.⁴

¹ B. Z. Seligman, "Studies in Semitic Kinship," *Bulletin of the School of Oriental Studies*, vol. iii, part i.

² See above.

³ Meredith Sanderson, *op. cit.*, p. 452.

⁴ Dr. Sanderson has written to me since, that this happens "usually when she is too old to marry anybody else, or unable to marry for any reason. The marriage is commoner among the Wangonde than with the Wahenga, and in both is not usually consummated." It is clear that in such a case marriage does not imply a simple condition of sexual union, and it might be said by some that this is not marriage, but merely provision for the widows. However, my whole contention is that marriage customs have been profoundly modified by rights of property. The right to privileges frequently implies the obligation of duties, and that a man "marries" his grandmother in order to provide for her is not psychologically to be confounded with the provision by a son for his aged mother. In other words, there is an essential difference between a marriage which means mainly economic provision and membership of the household, on the one hand, and marriage which is sexually consummated, on the other: there is also an essential difference between mere economic provision and a status which implies marriage with a number of legal and economic functions.

Among the Gbari, the father's mother and the mother's mother are called "wife," and the son's son and the daughter's son "husband," or "little husband." A man calls his father's father and his mother's father "wife-stealer," and, as we have seen before, a man may marry his grandfather's widows, though they are more regularly inherited by the sister's son (by whom they are also addressed as "wife" during the life-time of their husbands).

The Koro, a tribe speaking a semi-Bantu language, may marry the widows of their grandparents, as the Gbari do, but Mr. Meek found no traces of this custom in their relationship terms.¹ Moreover, the Muslim Hausa still address the wives of their grandparents as wives, though of course no marriage is permitted.²

Among the tribes dealt with, the Wa Yao, the Ba Ila, the Ba Kaonde and the Ashanti are matrilineal in descent and inheritance. The Wangonde and Wahenga, the Hausa, the Kyambu and the Gbari have patrilineal inheritance. Among the Gbari, though ordinary property descends in the male line, widows are taken by the deceased's sister's son; there are neither clans nor totems, but the *subi* (ancestor cult) of a mother is more important than that of a father. Clan descent is also patrilineal among the Wangonde and Wahenga.

THE ASSOCIATION OF MARITAL GERONTOCRACY WITH CROSS-COUSIN MARRIAGE.

I may now call attention to the remarkable fact that, in every instance in east central Africa in which granddaughter marriage takes place or is indicated in the kinship system, cross-cousin marriage is also practised, nor is this association of marriage forms accidental. We have seen that three of the tribes under consideration—the Wa Yao, the Ba Ila and the Ba Kaonde—are matrilineal; a man is succeeded by his sister's son, who thus inherits his mother's brother's widow. We are justified in taking these three tribes as essentially typical of the gerontocratic marriage, as among these people not only is the custom to be inferred from the nomenclature, but is actually followed.

Wa Yao.—"An heir, on succeeding, may marry the wife of his maternal uncle, but not if he has previously married one of his daughters." A woman addresses her husband's sister's child as "husband." The female cross-cousins are addressed as "wife." "Theoretically no marriage would be permitted between a girl and a younger *msiwani* (cross-cousin) or a stranger unless and until the eldest *msiwani* had waived his claim. In such a case the prospective bridegroom would give the latter a small present."³

The *Ba Ila* address all female cross-cousins as "wife," though latter-day customs only allow marriage with the daughter of the father's sister.

¹ Time only permitted a very short investigation of these people, and Mr. Meek was not able to record a full relationship system.

² Information given by Mr. Meek.

³ Information sent me by Dr. Meredith Sanderson.

Ba Kaonde.—Marriage is allowed with the daughter of the mother's brother, but not with the daughter of the father's sister.

The Wahenga address the wife of the mother's brother as "wife," and the cross-cousins are called "wife": marriage with them is allowed.

The Wangonde address the wife of the mother's brother as "wife," but the cross-cousins are regarded as brothers and sisters and marriage is not allowed.

Passing now to West Africa, among the Ashanti a man has undisputed right of marriage with his mother's brother's daughter; he addresses her as "wife." Among the Gbari, a man calls his mother's brother's wife "wife," and he inherits her on the death of his maternal uncle. He may not marry his mother's brother's daughter or any first cousin, but may marry his second cousins.

Thus, in all these cases where the old men have a right to marry young girls, the young men also have rights. A young man may have right of access to his mother's brother's wife or he may inherit his mother's brother's widow. Further, he has a right to his cross-cousin, his mother's brother's daughter. He cannot exercise both these rights, for he cannot marry a mother and daughter at the same time. It therefore seems reasonable to suppose that the cross-cousin marriage has arisen out of the right of access to the mother's brother's wife (or inheritance of the widow) by a transference, the daughter being accepted as a wife instead of the mother. That the two forms of marriage, that with the granddaughter and the cross-cousin, should be found among the same peoples is not accidental. If the old men had been able to establish gerontocracy, some provision must have been made for the young men, and they sought help from their natural protectors,¹ their mother's brothers, and claimed access to their wives, whom they would inherit in course of time. If the mother's brother promised his daughter in lieu of his wife, the cross-cousin marriage would have been established.²

As would be expected, where such marriages are customary, girls are betrothed and married very young. The marriage of immature girls is so customary among the Ba Kaonde that a Government inquiry was made into the matter: it was found that girls "are courted and wed between the ages of eight and thirteen, always before they have attained puberty . . . It is not uncommon for them to be wives three or four years before they are even capable of coitus."³

The close correspondence of the kinship system of the tribes considered confirms the supposition that the cross-cousin marriage has arisen from the inheritance of

¹ A curious paradox is found among the Gbari which, I think, is one of those "exceptions which prove the rule." A man may sell his sister's son into slavery (information from Mr. C. K. Meek) in order to redeem himself or his own son. The Gbari are now patrilineal, and instead of exercising their obligations to their sister's sons they claim their privileges over them.

² The bearing of this on mother-in-law avoidance is obvious, but is too complicated to be discussed in this paper.

³ Melland, *op. cit.*, p. 66.

wives from the mother's brother. The reverse order of events is so improbable that it need not be discussed, nor would it be profitable here to go through the other possible origins of cross-cousin marriage unconnected with inheritance.¹

THE ORIGIN OF GRANDDAUGHTER MARRIAGE AND OF ONE TYPE OF CROSS-COUSIN MARRIAGE.

In considering the origin of the customary marriage between persons separated by two generations two points must be kept distinct. Granddaughter-grandfather marriage is one thing, grandmother-grandson marriage quite another. The two forms are associated and may have originated together, or one may have arisen as a corollary of the other. While the former is a vindication of the rights of old men (gerontocracy proper), the latter upholds the hereditary rights of the young.

The granddaughter-grandfather marriage must now be considered in further detail. It might be thought that the granddaughter marriage belonged to a very early stratum of African society, and this was my idea before I examined the systems critically. Such a view would agree well with most of the theories of primitive organization that favour the existence of a group dominated by an old man or "the old men."² There are, however, serious difficulties in the way of accepting this. In the first place, the three most typical systems under consideration are matrilineal, and most of those African patrilineal systems that have been examined show signs of previous matrilineal organization, so that, whatever conditions may have prevailed in the earliest human group, it can be said with some degree of certainty that *matrilineal clan organization* has preceded *patrilineal clan organization* in Africa. Further, true marriage rights over relatives imply endogamy. If gerontocracy were the rule in an early matrilineal clan condition, how could a man have been able to claim a right over his children's children at a time when he had none over his own children who belonged to another clan? The rights would have been over the sister's children, and only if endogamy were allowed would these have been marriageable. However, in a dual grouping of inter-marrying clans some of the grandchildren would come under the ruling of the grandfather; but with exogamy these children would be unmarriageable. Thus, if a man belongs to clan "A" and his wife to "B" a man's daughter's daughter belongs to the clan of his wife, his son's daughter to "X," the clan of her mother; but if there ever had been dual clan grouping, clan "X" would be the same as "A." The grandchildren of the brother and sister are included as classificatory "grandchildren." The descent of the granddaughters of a brother would follow the same rules as that of own grandchildren.

¹ The subject has been dealt with very fully by Frazer, Rivers and Westermarck.

² A more primitive form of dominance of the old men may yet be found, *i.e.*, daughter marriage with matrilineal descent. In the only system of kinship published for the Bushmen there appears to be evidence for marriage with the daughter, but the information is not quite definite enough to come to any conclusion on the subject. (*J.R.A.I.*, vol. xlvii, p. 37, Dornan, "Tati Bushmen (Masarwas) and their Language.")

The descent of the sister's grandchildren would be different. A man could claim no right to his sister's son's daughter, for she must belong to a different clan: but the sister's daughter's daughter must belong to a man's own clan, and so would be the only granddaughter over whom a man could claim any rights in a matrilineal society. We are told among the Ba Kaonde (who are matrilineal) that this is the one granddaughter who cannot be married. Marriage with the granddaughter is therefore incompatible with matrilineal descent and exogamy and, in fact, all the matrilineal tribes among whom it is found are exogamous. Further, had gerontocracy of this kind, i.e., the marriage of people separated by two generations, arisen among a matrilineal people and exogamy not been insisted upon, we should have expected to see some signs that the sister's daughter's daughter (who is the sister's son's sister's daughter) was differentiated from all the other grandchildren, as she would have been the only marriageable grandchild. In no system is there any indication of this. It would seem, then, that the marriage with the granddaughter implies a partial recognition of the patrilineal system with matrilineal ideas of exogamy. I would suggest then, that the granddaughter marriage does not belong to the indigenous agricultural matrilineal stratum, but might be an innovation resulting from the early contact of invading Hamites with the indigenous peoples, when changes took place which resulted in the formation of the Bantu peoples. It was a partial attempt on the part of the invaders to impose patrilineal endogamous conditions. They must have married the indigenous population, but may also have been willing to marry their own grandchildren, irrespective of clan. This would account for the use of a single word for "grandchild" among the peoples with whom the marriage is customary. Otherwise, as indicated above, we should have expected one term for the sister's daughter's daughter, who must be of the same clan as the speaker, and another for the daughter's daughter and the brother's daughter's daughter, who must belong to different ones. The son's daughter and the brother's son's daughter would belong to the same clan only if dual grouping existed; otherwise they must belong to different clans.

Had this attempt succeeded and the marriage with the grandchild become universal, the young men would have had no rights unless they could claim the inheritance of widows. A certain number of mixed people might have been willing to adopt patrilineal descent and then may have been able to inherit the widows of the father's father, but only if these had been of a different clan to themselves. They would have had no rights to the widows of the mother's father, nor could they have taken the father's wives as compensation for the loss of the young women, for they would probably have considered them unmarriageable, owing to their ideas of incest, because they would be classificatory daughters.¹

¹ Note that the Gbari, who are patrilineal, inherit the widows of the mother's brother and of the matrilineal and patrilineal grandfather, but never of the father. It must be supposed that the right to the maternal grandfather's wife must have come about by a compromise between the two systems here combine.

Thus, though the indigenous peoples could not prevent the invaders setting up marital gerontocracy, they would have profited little by adopting patriliney. Therefore, where they were able to do so, they clung to the matrilineal rights of inheritance from the mother's brother. Possibly their claims to rights of access may have influenced their own elders (the mother's brothers) who, under the pressure of the new conditions, might readily have brought about the cross-cousin marriage to counter-balance the number of young girls lost to the young men by the gerontocracy of the invaders. In such conditions, when rights of access might have been more insistent than was convenient, and public opinion had already sanctioned the rights over children's children among the mixed population, the time would have been ripe to allow the transference of the right over a wife of the mother's brother to that over a daughter. For, if cross-cousin marriage has arisen through a transference of wife to daughter from inheritance of, or access to, the mother's brother's wife, it must have taken place in a matrilineal society where paternity was actually recognized. Otherwise, instead of offering his wife's child (therefore his own child) to his nephew in lieu of his own wife, on strictly matrilineal lines, he must have offered his sister's daughter. If he had another sister besides the mother of his nephew, this would have brought about the marriage of the children of two sisters, a form of marriage which, as far as I know, does not exist anywhere with matrilineal descent; whereas, if a man had only one sister, he would only be able to offer his nephew the latter's own sister!

I have thus supposed a state of society where an invading people, acknowledging the patrilineal principle, and with no objection to endogamy, were in conflict with a matrilineal agricultural people who practised exogamy. It is possible that the agricultural people already practised cross-cousin marriage, or that they only allowed the right of access to, and inheritance of, the maternal uncle's widow, and that the cross-cousin marriage arose from the culture contact, as I have suggested. On the other hand, their social condition may have been similar to that of the matrilineal Nubas of Southern Kordofan, where mating is free between unrelated men and women. Both men and women can terminate the marriage relationship when they wish and set up new marriage ties; widows are perfectly free to marry again with anyone whom they wish to marry, and old men cannot usually get young girls as wives, as is so frequent among the patrilineal peoples. The idea of women as inheritable property is non-existent among them.¹ On the whole I am inclined to favour the view that this may have been the condition of the agricultural people before the introduction of gerontocracy.

THE SOCIAL IMPORTANCE OF INHERITABLE PERSONAL PROPERTY.

If this second supposition should be correct, the foregoing scheme of the contact of the two peoples would require some modification. The incoming pastoral peoples

¹ Own unpublished material.

must have introduced two new ideas, patriliney, and the idea that women could be regarded as property. The idea of inheritance of property would have been well established, and the duties and privileges exercised between the maternal uncle and the sister's son, an integral part of custom, as among the matrilineal Nubas. If these privileges should have included the right of access to the wife of the maternal uncle by the sister's son, as is very possible, the way to inheritance in women by the sister's son would already have been paved. That rights of access to women and rights to property are regarded in the same light by savages is very clearly seen among the Ba Ila. For we are told that "Grandfathers hold their goods at the pleasure of their grandchildren,"¹ and "Between me and the collateral grandmother [classificatory] on my own side there is no taboo; I address each of them as *mwīnangu* ('my wife'), and may treat her as such . . . This is only an extension of the principle that my collateral grandfather's property is mine potentially. I may enter my grandfather's village, spear his oxen or rob his fields with impunity."²

It follows, from the evidence quoted in the previous sections, that we cannot consider the Wahenga and Wangonde with patrilineal descent as the typical examples of marital gerontocracy, implying the custom to have arisen among patrilineal peoples and to have spread to the matrilineal peoples. It is difficult to suggest how or why such a process could have been acceptable; moreover, we should then be at a loss to understand how the patrilineal Wahenga had adopted cross-cousin marriage.

If, as I have suggested before, among the indigenous population the women were quite free, then it seems possible that it was this very conflict between patrilineal endogamous invaders and a settled matrilineal population that established the conception of property in women among the matrilineal people, among whom, in a more primitive condition, it must have been absent, at least theoretically. In support of this I would like to emphasize the greater need for tenacity to property among pastoral than among agricultural peoples. Certainly in Africa we do find curious rights connected with the land, certain individuals being looked up to as "lords of the land."³ However, the conception of landed property is quite different from ours. The area of land that any man can cultivate is only limited by the amount of labour he can put on it. It would be impossible for a man to be poor because he lacked land to cultivate. The functions of the lords of the land, where these exist, seem to be mainly magico-religious. Thus land, from which the food of the people comes, is not personally inheritable property,⁴ perhaps because, no manure being used, no land is cultivated for any length of time. The same is true of house property; although among some tribes the houses of chiefs and important people are comparatively substantially built and kept in repair for many years, in a general way

¹ Smith and Dale, vol. i, p. 386.

² See footnote, p. 235.

³ Or literally "father of the land," *manyekak* of the Bari and *limonyumegi* of the Lotuka.

⁴ Land is usually tribal or communal property.

a house is not a permanency, nor would it be regarded as an asset to be inherited. Thus, to the agriculturalist, food and shelter depend upon labour, not upon personal property. The outlook of the pastoralist is entirely different; his flocks produce his food, but they are also real wealth—a realizable medium for exchange at any season of the year, in a convenient form, and so are wealth in a way that agricultural products never could be. Therefore the importance of inheritance is more essentially a part of pastoral than of agricultural culture. Without forming any conjecture as to the social organization of the incoming Hamites, it seems safe to say that once friendly relations had begun between them and the agriculturalists, the need of the incomers would have been for women, while the latter would undoubtedly have been attracted to the new form of real property introduced by the pastoralists.

We have only to suppose the exchange of needs—women for cattle—to see the beginning of the loss of freedom by women among the indigenous people, and eventually the establishment of the bride-price and the crystallization of the idea of women as inheritable property.

REINCARNATION.

Reincarnation of spirits of the dead in their living descendants plays an important part in the beliefs of the Ba Ila¹ and Ba Kaonde. Among the Ba Ila tests are made when a child is born to ascertain whose spirit it reincarnates, and it is accordingly given the name of the dead person. This is frequently a grandparent, though other relatives may be reincarnated, and the sex is not necessarily the same. An example is given of a chief who was reincarnated in his son's son; it is also said that a man can only be reborn on earth through his sons, not his daughters: a curious fact, as the Ba Ila are mainly matrilineal.²

Similar ideas are found among the Ba Kaonde, among whom spirits are reincarnated in descendants, frequently grandchildren, both the children of sons and daughters, the sex being immaterial.³

In Northern Nigeria reincarnation in descendants is also an important belief. Mr. Meek tells me that a child who bears a striking resemblance to his deceased grandfather would be given his name and treated with the utmost respect by his own parents; he would even be called "father" by his own father. Belief in reincarnation in descendants, especially in the second generation, is probably widespread, and possibly accounts for the frequent repetition of names in the second generation found in many African genealogies. That this belief is closely associated with the custom

¹ Smith and Dale, vol. ii, pp. 2, 127, 153 *et seq.* The subject is a complicated one, and probably many different ideas are concerned.

² Cf. the Ashanti, among whom reincarnation is important. Clan descent (*abusua*) is matrilineal, but a man belongs to his father's *utoro* division. (*The Ashanti*, p. 39.) Capt. Rattray tells me that a spirit can only be reincarnated in its own *utoro*.

³ Melland, *op. cit.*, p. 170.

of marriage with the grandmother is evident. If a man not only takes the place of his grandfather, but sometimes actually *is* his grandfather, it is not surprising to find that he may marry his grandfather's widows who, if the reincarnation has taken place, *are his own wives*.

It seems probable, though I cannot give precise evidence for it, that the belief in reincarnation in the persons of descendants is more widely spread than the prevalence of the custom of marital gerontocracy either in the past or at the present day. There seems no possibility that marital gerontocracy could have given rise to the belief in reincarnation in the second generation. Yet once the old men had been able to establish their rights over girls of the second generation, this belief may well have paved the way for the young men to claim a right to marriage with their grandmothers.¹ In this connection we may recall the fact that among the gerontocratic peoples considered in this paper, instead of great respect being shown to the grandfather by the grandson, he is addressed as friend, "compeer," and even wife-stealer.

RECAPITULATION.

Throughout this paper the rival tendencies of matrilineal and patrilineal principles have been recognized: and among the tribes considered, various compromises between the matrilineal exogamous and patrilineal gerontocratic, and endogamous principles have resulted. The Yao, Ba Ila and Ba Kaonde have all remained matrilineal and exogamous, but have adopted the gerontocratic type of marriage; they also practise the cross-cousin marriage. The Wahenga are patrilineal, and marital gerontocracy, said not to be practised, is expressed in the use of relationship terms: cross-cousin marriage is a right.

The Wangonde, though similar to the Wahenga in other ways, do not allow cross-cousin marriage and class the cross-cousins with brother and sister.

In West Africa the Gbari and Koro have patrilineal descent; the former have indications of marital gerontocracy in their system and both inherit the wife of the grandfather.

The Kyambu and Ashanti may perhaps be considered as respectively patrilineal and matrilineal peoples, only slightly influenced by marital gerontocracy.

It will be seen that in this paper I have assumed that the granddaughter-grandfather marriage, representing the idea of gerontocracy, was the important marriage and that the grandmother-grandson marriage followed in its wake because of the recognition of women as inheritable property. The fourfold reason for the acceptability of the grandmother may be summed up: (1) in the loss to the young men of unmarried women of equal age owing to the working of gerontocracy: (2) the fact that, owing to this marriage and to the working of the classificatory system, all grandmothers need

¹ It is interesting to note that Dr. Ernest Jones has found that the reversal of generations with the desire to marry the grandparent of the opposite sex and so become parent to one's own parents is a common phantasy among children. This phantasy is also associated with a belief in reincarnation. *Psycho-Analysis*, 2nd edition, chap. xxxviii and xxxix.

not be old women, though they may be older than the young men who marry them and would probably already be mothers: (3) that although pairing with a partner of equal age is natural, there coexists the acceptability of a mature woman by a youth owing to the transference of the natural attachment to the mother: (4) and, lastly, the belief in reincarnation may have encouraged a phantasy of identification with the grandfather.

The association of the two forms of marriage may have brought about the reciprocal terms of relationship for grandchildren and grandparents found among the Wangonde and the Ashanti. The argument that marital gerontocracy came about through the inheritance of the widows of the grandparents does not seem tenable, though it is true that, if once the inheritance of the widows of the grandparents had become an established custom, there would be a tendency to confusion in the use of the terms for grandparents and grandchildren, which might bring about the reciprocal use of terms. But to suggest that such a reciprocal use of terms would lead men to suppose they had a right to marry their granddaughters is to put the cart before the horse: it suggests that the actions of "savage" man are instigated by some crazy logic dependent on words, rather than that they are the outcome of real social needs and that the words themselves express a social usage.

DISTRIBUTION OF MARITAL GERONTOCRACY.

The geographical distribution of the custom of marital gerontocracy in Africa is a problem that can only be tackled very tentatively, for our knowledge on the subject is still rudimentary. When I began to write this paper, I only knew of this custom in Nyassaland and Rhodesia and hesitated to include Ashanti on the slight evidence I then possessed, *i.e.*, the reciprocal relationship terms used between grandchildren and grandparents and the special avoidance of great-grandchildren. Since then Mr. Meek has given his evidence from Nigeria, and it seems reasonable to suppose that the same factors have been at work in Ashanti and Nigeria. It is quite possible that other evidence may be brought to light from other parts of Africa. However, it is probable that it does not occur in those parts of the Anglo-Egyptian Sudan, Uganda and Kenya Colony where investigation has already been made into the social systems of a number of tribes.¹

The chief evidence for the custom of marital gerontocracy is found among the Bantu tribes in Northern Rhodesia and Nyassaland. If it is to be ascribed to the Hamitic influence among these peoples, it is presumably due to a Hamitic strain in West Africa, and now that the custom has been discovered among the Hausa and

¹ Since writing the above, Mr. H. Ingrams has given me the following information. The Wa-Pemba, the so-called aborigines of Pemba Island, the northern island of the Zanzibar Sultanate, call the wife of a grandson *mke wangu*, "my wife," but a man has no right over his grandson's wives, thus differing from the Ba Ila, where the wife of the grandson is called *mwianangu*, "my wife," and a man has every right over her person. (Smith and Dale, *op. cit.* vol. i, p. 342.)

the Koro, a tribe speaking a semi-Bantu language, it is also possible that it may be due to the same source among the Gbari and Ashanti.

It may be asked, then, why is this custom absent among Hamiticised tribes in North-Eastern Africa? We have to deal with wave after wave of immigrations of cattle-owning Hamites, so that it is not a simple question of the fusion of two peoples, but one of recurring immigrations of similar people and their fusion with peoples already mixed in varying degrees. It seems certain that North-East Africa has suffered more heavily from these immigrations than other parts, so that, except among certain isolated negro communities, patrilineal descent is firmly established and a man normally inherits his father's wives. Where this happens, naturally he cannot also inherit his grandparents' wives. This, however, would not prevent him exercising rights of gerontocracy if he had ever been able to establish them. In this area cross-cousin marriage is rare, but there is much evidence for the right to take accessory wives from the wife's family.¹ An old man is always able to purchase young wives, and it is probably not without significance that the bride-price is so generally paid in cattle. Perhaps, then, owing to the predominant Hamitic influence, there was no need here for the establishment of gerontocratic rights within the family in the more definitely patrilineal areas.

COMPARISON WITH MELANESIA, AND CONCLUSIONS.

I will now compare the gerontocracy of Africa with that described by Rivers in Melanesia.² The similarities are striking: in both areas gerontocracy is chiefly associated with matrilineal descent,³ and in Melanesia cross-cousin marriage is common but not universal, but in the Buin district on Bougainville in the Western Solomons the cross-cousin marriage is associated with the marriage with the wife of the father's father.⁴

In the Pentecost system (in the New Hebrides), where marriage with the daughter's daughter of the brother is found, some of the relationship terms are used in an anomalous fashion. Identical anomalies are found among the Wangonde and Yao. In both districts it has been possible to trace the cross-cousin marriage as a modification of the marriage with the wife of the mother's brother. On the whole the African systems of kinship are simpler, and the use of the term "wife" for all the grand-

¹ I do not wish to confuse the general argument of this paper with the discussion of another form of marriage, that with the wife's brother's daughter. This form of marriage was first described by Junot among the Ba Thonga, and I was able to indicate its presence among Nandi and Masai. I have since found much evidence for its presence in the Anglo-Egyptian Sudan, and Dr. Meredith Sanderson has recorded its practice among the Wahenga and the Wangonde. I consider that this form of marriage, though among the last two mentioned tribes it is found with gerontocracy and cross-cousin marriage, is associated essentially with the patrilineal principle.

² *History of Melanesian Society and Kinship and Social Organization*. The Fiji system is patrilineal, as is that of the Wangonde and Wahenga.

³ *Op. cit.*, vol. ii, pp. 28 and 60.

⁴ Rivers, *op. cit.*, vol. ii, p. 61.

daughters, wives of grandsons and grandmothers, is not found in Melanesia. So that, in Melanesia, Rivers had to infer relationships that are clearly stated in the African systems. In Africa, though the custom may be on the wane, it has a far more vigorous life than in Melanesia. The greatest difference lies in the fact that, in Melanesia, all the marriage customs discovered are intimately associated with a dual organization of society, while among the African tribes in question no trace of dual organization has so far been described.¹ In Melanesia, Rivers considered that the people who established gerontocracy were the immigrant section, whose fusion with the indigenous population formed that ancient stratum which is characterized by the dual organization.

The points that I have brought forward in this paper are, that the marriage of persons separated by two generations is no longer a hypothesis, but in Africa an established system: the association of this form of marriage with the cross-cousin marriage is intimate: both marriages are the result of the conflict between patrilineal and matrilineal principles. Further I have suggested, that while the former was introduced into a matrilineal society by the *force majeure* of an incoming patrilineal people, the latter came about in a matrilineal society under the influence of the patrilineal principle; that from this same conflict of cultures arose the conception of women as inheritable property and the custom of paying a bride-price in cattle: that this was due to the influence of pastoral people who, owing to the nature of their life, are more tenacious of property than the agricultural peoples and are actually able to conceive of property as wealth. Thus with the increased importance of wealth we see the establishment of "arranged" marriages.

I have drawn attention to the connection between marital gerontocracy and the reincarnation of spirits in the second generation, and suggested that this belief may have paved the way to the grandmother marriage.

In conclusion I would add that this information has been put together without any reference to any theory of separate origins of customs or their spread due to migrations. The similarity between these customs in Melanesia and Africa is striking. In both places there is evidence for the establishment of cross-cousin marriage by means of a modification of inheritance of the mother's brother's wife, but it is obvious that this marriage may have come about in other ways, and it is not necessary to suppose that the same mechanism has been at work everywhere. Further, I have been dealing with agricultural peoples all of whom have been influenced more or less by pastoral peoples: the immigrations to which I have alluded have no apparent bearing on the origin or spread of agriculture, which must have taken place at an earlier date.

¹ I am aware that Mr. Perry considers cross-cousin marriage itself an indication of dual organization. (See *Children of the Sun*, W. J. Perry, chap. xxiii.) But in the present state of our knowledge this judgment seems to me entirely arbitrary, especially in view of the development of this form of marriage in two distinct localities by means of inheritance.

NEANDERTHAL MAN IN MALTA.

BY SIR ARTHUR KEITH, F.R.S.

With an account of the survey of Dalam Cave (Ghar Dalam)

by MR. GEORGE SINCLAIR, A.M.I.C.E.

[WITH PLATES XXXIII AND XXXIV.]

IN the summer of 1918 a Committee of the Anthropological Section of the British Association met in the Conservator's Office at the College of Surgeons to arrange for the publication of reports from Research Committees. Among the reports received was one from Dr. G. Despott, Curator of the Natural History Museum, Malta, giving an account of excavations carried out in Ghar Dalam during July and August of 1917. These excavations were conducted on behalf of a Committee of the British Association, of which the Chairman was Professor J. L. Myers and the Secretary Dr. Thomas Ashby. Amongst the photographs which Dr. Despott submitted as illustrations for his report was one reproduced on Plate XXXIII. Eight teeth are represented: those numbered 1 and 2 are peculiar in shape: the remaining six conform in every respect to the types now prevalent in modern Europeans. A glance at this photograph was sufficient to convince anyone who had made a special study of teeth, particularly those of *Homo neanderthalensis*, that Nos. 1 and 2 belong to this strange species of man, and that Dr. Despott's discovery had carried the distribution of this species—already known at Gibraltar—right to the middle of the Mediterranean.

On reading over Dr. Despott's report, I was surprised to find that no trace whatsoever had been found in any part of Ghar Dalam of the culture of palæolithic man—nothing Mousterian, nothing Aurignacian—save a flint knife which I was told might be assigned as reasonably to the neolithic period as to the culture of the late cave period. The stratum of red cave earth which had yielded the teeth had also contained abundance of objects of the neolithic period—pottery, flint scrapers, bone instruments, ornaments, and others even of a later date. The 2nd molar occurred at a depth of only $2\frac{1}{2}$ feet (76 cm.) below the surface of the cave floor: the partially formed 3rd molar was a foot deeper in the same red earth deposit and nearly 7 feet (2 metres) away from the other.

With archæological evidence all against me, my letter to *Nature* (July 25th, 1918, p. 404), announcing the discovery of Neanderthal man in Malta, may have seemed foolhardy, and it may be well to give here the grounds on which my assurance

was based. In Fig. 1 (I) are represented the series of developmental stages which end in the formation of an upper molar tooth of the European type; in the lower series (II) are shown the corresponding stages which end in that peculiar type of molar which is found only in man of the Neanderthal type—the type of tooth to which I have proposed the name *taurodont*.¹ It will be seen that in both types (Fig. 1, A, A) the crown and neck are formed in exactly the same way. It is in the next stage (B, B) that a difference in the order of development appears: in the upper, the pulp cavity is being enclosed by a turning inwards of the growing margin of the dental wall: a floor or operculum is being thus formed. In C of the upper series the roots are being formed, the pulp cavity undergoing an extension downwards into them. In D (I) growth has ended; the roots are now completed. The floor or operculum of the pulp cavity, as may be seen from a comparison of stages in the upper series, becomes

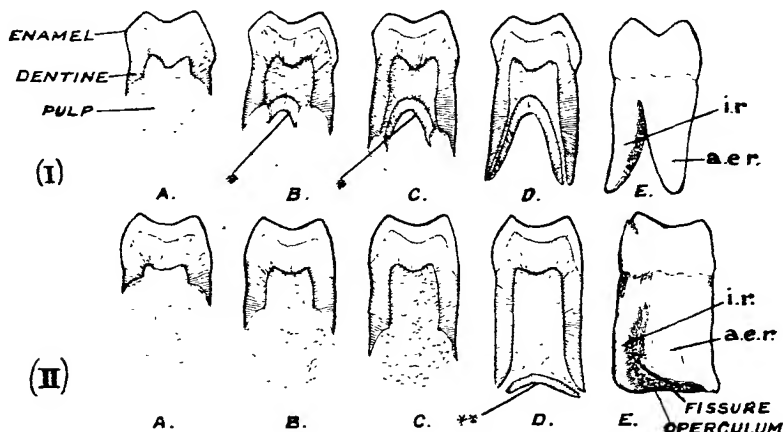


FIG. 1.—DEVELOPMENT OF ROOTS AND PULP CAVITY.

(I.) In an upper molar of European type.

(II.) In an upper molar of a type peculiar to Neanderthal man.

(I.) A, the crown and neck being formed on the pulp papilla: B, a further stage where the dentine turns inwards to form a floor for the pulp cavity: C, the formation of the separate roots: D, the roots completely formed: E, proximal aspect of 2nd upper right molar; *i.r.*, inner root; *a.e.r.*, proximal external root.

(II.) A, B, C, D, corresponding stages of the *taurodont* molar of Neanderthal man. The floor or operculum of the pulp cavity is not formed until the final stage of development is reached. E, the proximal aspect of the 2nd upper molar of right side which was found by Dr. Despott. A groove on this aspect indicates the junction of the internal and external root areas. The operculum is shown and the fissure of entrance to the pulp cavity.

extended in the roots to their tips. The only entrances to the pulp cavity are the three openings situated on the tips of the three roots. In the *taurodont* molar the formation of the floor of the pulp cavity, which takes place at stage B in the upper series, is delayed until stage D of the lower series. In this latter form, roots are not

¹ "Problems relating to the Teeth of the earlier forms of Prehistoric Man," *Proc. Roy. Soc. of Med.*, 1913, vol. 6 (Odontological Section), p. 1.

differentiated as separate structures. But their substance can be recognized on the body of the tooth (Fig. 1. E. *i.r.*, *a.e.r.*). The floor of the pulp cavity is developed at the bottom of the tooth, forming a door or operculum to the pulp cavity, its form being somewhat reminiscent of the trap-door of the nests of certain spiders. The nature of the taurodontal change in tooth formation may be explained by the use of a homely illustration. It is the fashion in Europe to separate the legs of trousers—which correspond to the roots of the teeth—up to the fork of the thighs. But there have been fashions where the seat of trousers, corresponding to the floor of the pulp cavity, has been carried down to the level of the knees, or even to the ankles. In teeth of the taurodont form the seat is carried to correspondingly low levels, or, as in this example from Ghar Dalam (Fig. 1. E), carried to the level of the ground and thus turned into a skirt.

Now, a tendency to taurodontism is present to a very limited degree in teeth found in men of the modern type; the tendency is always more marked in the third molars than in the first; it is more developed in lower molars than in the upper. But, after a long experience of actual specimens and a wide search of literature, I am convinced that a high grade of taurodontism never occurs in modern man;¹ in teeth of the modern type fusion of roots frequently happens, but this is a totally different state of matters. In the most marked examples of taurodontism I have ever seen in modern neolithic teeth, the roots, although fused together, yet had their independent root channels. Neanderthal man is the only type which shows a constant tendency to taurodontism. In the oldest example known, the teeth of the Heidelberg jaw, the pulp cavities are relatively and absolutely large: in the teeth of the men of Spy the degree of taurodontism is not more than has been seen in teeth of palæolithic man of the European type. In the teeth of the Gibraltar skull only the tips of the roots have been differentiated; in this instance the degree of taurodontism has reached a characteristic amount. This was also the case in the teeth found by Dr. R. R. Marett in a Mousterian floor in Jersey. The most marked examples yet discovered were found at Krapina; among the Krapina upper molars there are teeth which are exact replicas in every respect of those found by Dr. Despott in Ghar Dalam. As Neanderthal people grow old and the crowns of their teeth become worn, the pulp cavity is filled up to a greater or less extent by the formation of new dentine. Thus, although taurodontism of a high degree is not present in every individual of the Neanderthal type, yet it is only in members of this race that high degrees of it have been observed. I am also of opinion that, as the Neanderthal type evolved, this curious feature of the teeth became more emphasized, and that taurodontism occurs in a high degree in the later generations of this race. Certainly taurodontism must be regarded as a change of a degenerative nature. At least, it is a character which is the opposite of being primitive or simian. If this inference is

¹ I have discovered, since this article was written, an instance of taurodontism in modern man. It is recorded by Dr. H. P. Pickerill, *Proc. Roy. Soc. of Med.*, 1908-9, vol. 2 (Odontological Section), p. 150.

right, then the Neanderthal people in Malta may be assigned to the later part of the history of this race—to the terminal phase of the period of Mousterian culture in Europe.

In the summer of 1918, as soon as I got to know of Dr. Despott's discovery, I proceeded to gather information concerning Ghar Dalam. I found that this cave was about five miles from Valletta and was situated on a bay, Marsa Scirocco, which indents the south-eastern corner of the island. From one of the inlets at the head of this bay, a rocky ravine—the Wied Dalam—cuts into the limestone plateau of the island in a north-westerly direction. After ascending this ravine from the shore for about 660 yards (220 metres), the traveller finds the mouth of the cave on his right hand, about 50 feet above the level of the sea. The cave, which varies in width from 20 to 60 feet and in height from 10 to 18 feet, runs in a north-easterly direction for 270 feet. At this point it branches in several directions, its total length

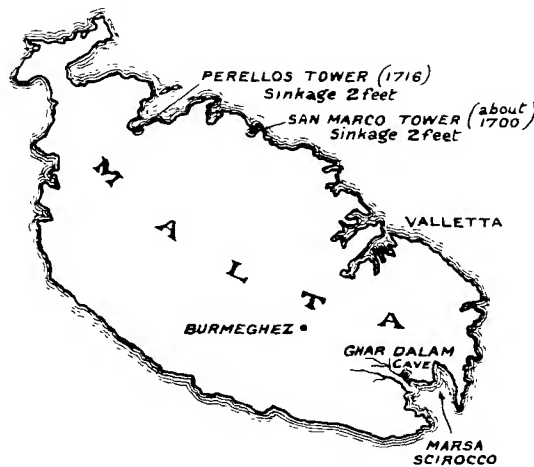


FIG. 2.—SHOWING THE POSITION OF GHAR DALAM AND OF BURMEGHEZ CAVE.

being over 700 feet. It has been formed in one of the basal strata of the island—coralline-limestone—and its direction will be observed to lie almost at right-angles to the ravine on which its mouth opens.

In the winter of 1912–13 an exploration was undertaken by Professor Tagliaferro and Dr. Despott, who cut a trench across the floor of the cave 350 feet from its entrance. In 1914 the exploration was taken over by a Committee of the British Association. Under its auspices Dr. Ashby, Dr. Zammit and Dr. Despott cut a cross-trench 200 feet from the entrance, and issued their report in *Man*, 1916, No. 14, p. 17. In this report a full account is given of excavation carried out in Ghar Dalam prior to 1914. The work of the Committee was continued by Dr. Despott, who in July, 1916, cut another cross-trench 115 feet from the entrance. His results were published in the *British Association Reports* for 1916. Then, in July and August, 1917,

Dr. Despott cut two fresh trenches across the floor of the cave—trench I at 50 feet from the entrance, and trench II at 110 feet. It was in trench II that the teeth to be described in this paper were discovered. Dr. Despott's account of these two trenches and what they revealed is published in this *Journal* (1918, vol. xlviii, p. 214).

The fact set out in the above account represents the state of knowledge of Ghar Dalam in the summer of 1918, when my letter was published in *Nature*. In this letter I appealed for funds to assist the Committee in its exploration of this vast cave, and thanks to liberal subscriptions from the late Sir Thomas Wrightson, Mr. Robert Mond and a few others, a sum of £130 was placed at the Committee's disposal, and thus, in 1918, 1919, 1920, Dr. Despott was able to explore the greater part of the floor of the cave between and also beyond the two trenches he cut in 1916—namely, that part of the floor which lies between the 50th foot from the entrance and the 140th foot. His report is published in this *Journal* (1923, vol. liii, p. 18). Although no further remains of palæolithic man were discovered, nor was any trace of his culture to be seen, yet the new facts which were thus gathered proved most helpful in unravelling the age of the cave and of the various deposits on its floor. Helpful too, were the papers published by Miss Dorothy M. A. Bate in the *Proceedings of the Zoological Society of London* (1916, pp. 421–430) and in the *Geological Magazine* (1920, vol. lvii, p. 208), in which she describes the fossil remains of animals found in the deposits of Ghar Dalam. There has also appeared in the pages of this *Journal* (1922, vol. lii, p. 164) Dr. L. H. Dudley Buxton's valuable account of the people of Malta of Neolithic and of subsequent periods.

The circumstances, however, which have placed the most helpful facts at my disposal are these. Thanks to the courtesy of Dr. Zammit, Rector of the University of Malta, and of Dr. G. Despott, Curator of the Malta Natural History Museum, I have had now an opportunity of examining all the human teeth found in the strata of the cave, and of comparing their condition of fossilization with that of fossil bones from the deeper and older bone stratum of the cave. I may say at once that the mineralized condition of the teeth which I regard as Neanderthal is totally different from that of all the other human teeth. In their degree of mineralization these two teeth are in the same state as are the fossil bones from the upper part of the deepest and oldest fossil-bearing stratum of the cave. Further, in all their morphological characters these teeth are duplicates of types which occur in the Neanderthal race, at St. Brelade in Jersey and at Krapina in Croatia. Beyond a doubt Neanderthal man did exist in Malta, for we cannot conceive that a neolithic immigrant to Malta would gather such teeth from the deposits of a palæolithic cave and carry them to this cave in Malta.

Another fortunate circumstance came to my aid in 1921. My cousin, Mr. George Sinclair, an able civil engineer in the service of the Admiralty, was stationed in Malta. Being interested in palæolithic caves, Dr. Zammit suggested that he should

make an exact survey of Ghar Dalam—to expose its original rock floor, to determine the level of this floor to the sea, to chart the strata as determined by old trenches and as elucidated by the sinking of fresh ones, and to map out the sites at which former excavations had been made. In his holidays and leisure hours Mr. Sinclair threw himself into this task, and how completely he has carried it out will be seen from his report and plans printed at the end of this paper. He sank trenches between the mouth of the cave and the edge of the ravine (Wied Dalam), and was thus able to trace the strata and rock floor from the edge of the ravine into the cave. He sank a trench in the talus which had formed below the entrance to the cave. He dug trenches within the cave itself until its rock floor was reached. He found that the floor was almost on the same plane from end to end of the cave and that its level was 27 feet (8·2 m.) O.D. He correlated the deposits from end to end of the explored part of the cave and showed that they represent a series of deposits of four periods. His observations and measurements place data at our disposal whereby we are able to correlate the deposits in this Maltese cave with those in the palæolithic caves of Grimaldi, on the northern shore of the Mediterranean, near Mentone.

Mr. Sinclair rendered me another very important service. It was possible that the Maltese of the Neolithic period might have developed, as a local characteristic, a taurodontic condition of teeth, although such a condition had never been observed in any race of the modern type. Some 3 miles inland from Ghar Dalam, situated on the plateau of the island, about 300 feet O.D., is the village of Imkabba. Half a mile to the north of this village is Burmeghez, where the stratum of globigerina limestone is quarried (Fig. 2). As quarries are extended, great cave-like fissures are exposed in the rock. In 1913 one of these fissure-caves was exposed at Burmeghez; it was roughly triangular in section. Its apical part had opened on the surface of the ground at one time: red soil and other surface *débris* had been washed through the opening into the floor of the cave by rain-floods. Professor Tagliaferro found that neolithic man had also entered the cave at Burmeghez and had used it as a burial place. In 1914 the cave was again examined by Dr. Ashby and Dr. Despott; in the deeper strata remains of late pleistocene or early neolithic mammals were found. The Burmeghez cave is of the slanting crevice type; former investigators had left untouched the deposits in the recess at the extremity of the downward-slanting floor. To the excavation of this recess or pocket Mr. Sinclair applied himself. The pottery and objects of culture which it contained were identical to those found in the Hypogeum of Hal-Saffieni, which lies to the north of Burmeghez, midway between this quarry and Valletta. The skulls, most of them very imperfect, were of the same types as were found in the Hypogeum, and are therefore of a late neolithic people—the same people, so we may presume, who frequented Ghar Dalam in neolithic times. Mr. Sinclair gathered from this neolithic deposit 2,250 very perfect human teeth, which I have examined in detail. Interesting as the study of these teeth has been, all I need say now is that no trace of taurodontism was to be seen in

them. The form of degeneration which was present is that which we are familiar with in modern teeth—fusion and maldevelopments of the roots, particularly in those of the 3rd or “wisdom” molars. We cannot therefore attribute these taurodontic teeth from Ghar Dalam, even if their mineralization had been less complete, to neolithic men who lived in Ghar Dalam and buried their dead in its floor.

Before describing the two fossilized teeth it will be well, in the light of more recent observations made by Dr. Despott and Mr. Sinclair, to review the circumstances which attended their discovery, to discuss the age of the various strata of the cave, and the origin of the various objects which have been found in them. In Fig. 3 there is represented a section across the strata on the floor of the cave at the site where the Neanderthal molar teeth were found. The cave here is 29 feet wide and its strata almost 15 feet (4.5 m.) in depth. There are four series of deposits. (1) On

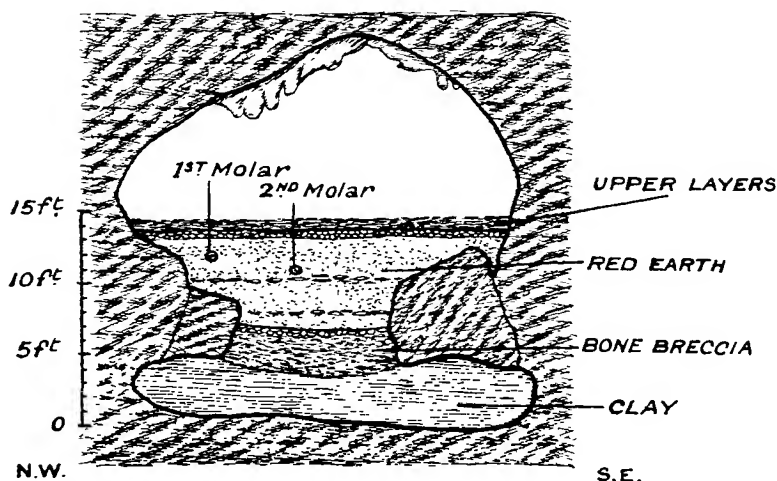


FIG. 3.—SECTION ACROSS GHAR DALAM AT THE SITE OF TRENCH II (110 FEET FROM ENTRANCE), WHERE THE NEANDERTHAL TEETH WERE EMBEDDED.

The points in the stratum of red cave earth where they were found are indicated. The section of strata here depicted is based on data given by Mr. Sinclair and Dr. Despott.

the floor of the cave, and occupying the recesses under the polished ledges which project from its side, is a deposit of yellowish-blue clay varying in thickness from 3 feet near the entrance of the cave to $2\frac{1}{2}$ feet towards its inner part. It is sterile: its upper stratum is hard. (2) Over the clay comes a bone breccia—rounded pebbles similar to those now on the shore of the neighbouring bay—and so thickly interspersed with fossil remains of three species of extinct elephants and two of hippopotamus that fossil bones make up 75 per cent. of the entire stratum. At the point of section (Fig. 3) this bed, including the boulder layer which caps it, measures 3 feet in thickness. Near the entrance to the cave the breccia layer has a depth of $3\frac{1}{2}$ feet: towards the back of the cave it tapers down to $1\frac{1}{2}$ feet. The fossil bones, as well as the pebbles, are water-rolled and smoothed, and when we remember that this stratum lies at the

level of 30 feet O.D., the same height above the Mediterranean as that occupied by the old sea-beaches of the Monastirian series round the shores of the Mediterranean. one may legitimately infer that the rolling of the component elements of the bone-breccia stratum goes back to the period of submergence when the Monastirian beaches were laid down. In the caves of Mentone the Monastirian beach is represented : over it lies a deposit of the Mousterian period—the period of Neanderthal man. Over the Mousterian deposits at Mentone are those of the Aurignacian age. The fossil remains which were rolled into the breccia stratum in Ghar Dalam must have been remains of animals which had accumulated and become mineralized on the floor of the cave—before the period of Monastirian subsidence, before the Mousterian period, and before the coming of the Würm glaciation. These fossil remains of the bone breccia, then, may be of various ages, but the latest must belong, on Professor Boule's mode of classifying Quaternary deposits, to the lower Pleistocene.

(3) Over the bone breccia and its upper layer of rounded boulders comes the red cave-earth in which the molar teeth were found. At the point shown in Fig. 3 this deposit is 6 feet in thickness ; near the mouth of the cave it reaches a depth of 8 feet, while towards the back of the cave it tapers down to $4\frac{1}{2}$ feet. This deposit is imperfectly stratified : usually two bone layers may be recognized in it—an upper and lower. In position and sequence it corresponds to the deposits of the Mousterian and Aurignacian periods in the floors of the Grimaldi caves at Mentone, and the nature of the fossil remains found in the cave earth is in harmony with this inference.

(4) The fourth, or superficial deposit, varies in thickness from $1\frac{1}{2}$ to 2 feet ; at the section shown in Fig. 3 it was $1\frac{1}{2}$ feet thick. In the superficial or neolithic stratum, at the site of section (Fig. 3) and towards the N.W. wall of the cave—on the left hand as one faces the back of the cave—Dr. Despott observed traces of several neolithic hearths. It is quite evident, too, that the neolithic people dug into and disturbed the upper parts of the underlying deposit of red cave earth ; shards of their pottery have been found as deep as $3\frac{1}{2}$ feet below the upper surface of the red cave earth. The Neanderthal molars lay at the same level as, and side by side with, the remains and objects of culture of neolithic man.

How, then, have teeth assigned to a race which became extinct in Europe with the Mousterian culture come to be mingled with the remains and culture of neolithic man ? In the upper feet of the red cave earth, in all parts of the cave, there has been found, side by side with neolithic pottery, fossil remains of *Hippopotamus pentlandi*, *H. minor*, *Elephas mnaidrensis*, besides innumerable remains of the stag, *Cervus elaphus barbutus*. In the lowest part of the cave earth, above the upper boulder layer of the bone breccia, has been found an intact mandible of *Elephas mnaidrensis*. In the deepest part of the red cave earth unrolled remains of this elephant are abundant : in one trench, which was cut 4 feet deep in the cave earth, Dr. Despott found the skull of this elephant with the vertebræ of the neck in their natural relation to the skull, showing they came to lie there while still united by

ligaments and muscles. These animals were still alive in these ancient Maltese lands when the oldest deposits of the red clay earth were forming, and, as I infer, when Neanderthal man occupied a Mediterranean land now almost completely submerged.

The problem of the mix-up of diverse ages in the four upper feet of the red cave earth does not concern only those two molar teeth of Neanderthal man: they are in company with fossil remains of two extinct species of hippopotamus, of an extinct elephant, two varieties or species of stag, of a vole, of pleistocene birds and mollusca. Clearly the explanation is that neolithic man dug into the cave earth for several purposes and at many places. Here his dead were buried. At the side of the cave near to where Dr. Despott found the Neanderthal molars, but about two feet deeper in the cave earth, Mr. Sinclair found a lower human molar tooth—that of the present-day type of man. In its condition of preservation this molar was exactly similar to the teeth of deer obtained at the same level of the brick earth. Neolithic man had disturbed the natural records in the upper strata of red cave earth: but we do not, or should not, reject them as reliable documents on this account. As archæologists have had to do in many previous instances, we have in this case to unravel the confusion which neolithic man has wrought. A glance at the section depicted in Fig. 3 shows ledges which project from the sides of the cave: above the ledges are fissures and recesses in which remains derived from deposits older than the red cave earth may lurk. Mr. Sinclair found these recesses to contain fossil remains which, if disturbed, as they might have been by neolithic or palæolithic man, would fall into the upper strata of the red earth. It was in one of those upper recesses, filled with red cave earth, that Dr. Despott found the bones of a limb of *H. pentlandi*. Luckily for my present purpose, the condition of fossilization and the characters of crown and root differentiated these Neanderthal teeth from those of late palæolithic or neolithic man, with which they would have been confused otherwise. Further, their date is pleistocene—very probably mid-pleistocene, certainly post-Monastirian.

I now come to describe the two teeth. As already stated, they are hard, heavy and mineralized: the enamel is of a bluish dark opalescence: the neck and root are of a dull chalky grey. Although they were found nearly 7 feet apart and the one a foot deeper in the red cave earth than the other, there can be no doubt they are members of the same set of teeth. One of them had not completed its development at the time of death: its crown and neck are formed, the root part of its body (Pl. XXXIV, B²) is not yet developed. This molar was in process of eruption. The arrangement and conformation of cusps indicates that it was the 3rd molar of the right side: it is therefore from the mouth of a young individual, probably a male, about 16 or 17 years of age. The other tooth (Pl. XXXIV, A²), the one completely formed, but with cusps unworn save for an impression on the anterior border of the crown, is the 2nd upper molar, also of the right side. A comparison of the crowns of the two teeth leaves no doubt in my mind that this is the second member of the series of which the erupting molar formed the third and last of the series.

The following table gives the measurements of the teeth :—

- A. Medio-distal diameter of the crown.
- B. Labio-lingual diameter of the crown.
- C. Medio-distal diameter of the neck.
- D. Labio-lingual diameter of the neck.
- E. Height of crown, from tip of cusps to enamel margin of neck.
- F. Length of root, from enamel margin to bottom of root.
- G. Height of cusps above hollow of crown.

		A.	B.	C.	D.	E.	F.	G.
		mm.	mm.	mm.	mm.	mm.	mm.	mm.
M2	...	12	12	9·1	13	7·2	15·2	1·5
M3	...	10·7	12·5	9	13	7	6·7	1·1

Amongst the neolithic teeth I found a few which were 12 mm. or even 12·5 mm. in labio-lingual breadth : several, too, almost equalled the medio-distal diameter of the two teeth here described. In none of these, however, did the labio-lingual diameter of the neck exceed the same measurement of the crown as in the case in these Neanderthal teeth. In none was there the same peculiar formation of body and root which these two teeth possess. The operculum, or shutter, of the 2nd molar measured 13 mm. by 10·2 mm. (Pl. XXXIV. A⁵). Round three of the borders of the operculum opens the fissure which leads to the pulp cavity. At its fourth border, the lingual border (*see* Pl. XXXIV. A⁵), the operculum is continuous with the dentine wall of the pulp cavity between the parts of the body which represent the anterior labial root and the lingual root. On the lingual aspect of the anterior internal cusp is a cingular cusp (Carabelli's cusp) (Pl. XXXIV. A²).

The enamel of the cusps is sharp and crystalline. In both teeth all four cusps are well developed, but the postero-internal cusp has a fuller development in the 2nd molar than in the 3rd. The details of cusp formation differ from those seen in the cusps of modern man, particularly as regards the size and length of the postero-internal cusps. These details may be studied in the faithful drawings made by Mr. Sewell and reproduced in Pl. XXXIV. In size and form such teeth have been seen in no race of mankind except *H. neanderthalensis* : in condition of fossilization and in the fauna which kept them company, in the red cave earth in Ghar Dalam, they are in their proper pleistocene setting. So we may conclude with certainty that at one time there lived on a land now mostly submerged beneath the Mediterranean the peculiar race of men who inhabited a great part of Europe during a long stretch of the Pleistocene period. One aspect of this discovery is quite exceptional. At nearly all other sites where Neanderthal man has been found the remains of his culture have abounded : but here no sign of his handiwork has been seen—only these two humble members of his dental series.

GHAR DALAM AND THE EURAFRICAN LAND BRIDGE.

By GEORGE SINCLAIR, A.M.I.C.E.

With some additions by SIR ARTHUR KEITH.

GHAR DALAM has been the scene of many investigations over a great number of years by different scientists and others whose object, however, has invariably been the salvage of animal or other remains, in which the cavern is particularly rich.

The investigation of which this paper is the issue was undertaken at the desire of Professor Zammit, Rector of Malta University, to throw some light, if possible, on the many physical problems of the cave and its deposits and to endeavour to get them into some sort of order and perspective.



FIG. 4.—THE SOUTH-EASTERN PART OF MALTA, SHOWING POSITION OF CAVE AND MARS SCIROCCO.

Plan and Sections of Cavern.

The first thing necessary for our own and further explorers' use was a plan and sections of the cavern. Only the front part of the cave, 270 feet in length, is dealt with here: beyond the limits shown in the drawing (Fig. 7) the cave branches backwards in several directions, following labyrinthine fissures in the rock. In these hinder branches falls of roof and other obstacles are such that extensive exploration of these portions are unlikely ever to be undertaken.

Cross-sections of the cave were proved by sinking further trenches and driving short headings under the overturned rocks as required. Cross-trenches Nos. 1 and 2 were continuations of the excavations made by Dr. G. Despott in 1916-18, and No. 3 a continuation of Dr. Ashby's trench made in 1914.

In all these cases the material met with between the bottom of the old trenches and rock floor was a dense layer of yellowish-blue plastic clay free from stones and containing no animal remains of any sort.

The rock bottom exposed was worn and uneven, but free from fissures or other irregularities. The rock consists of the upper layer of lower Coralline Limestone of the Malta series and is of what is termed locally "seconda," or second quality.

No previous excavations had been made outside the cave, the writer (G. S.) being the first to break ground there.

The upper trench immediately outside the entrance was sunk with the object of finding, if possible, the original sill of the cave (Figs. 6, 7). The upper 4 feet consisted of cave *débris* brought out by previous excavators, and the next 5½ feet was a dense unstratified deposit of torba clay, apparently mixed with red soil, and altogether of a coarser description than the fine torba silt found in thin layers at corresponding levels inside the cave. No organic remains of any description were found in this layer. Immediately under this was a deposit of large angular stones and boulders, closely packed and wedged together, but with abundant animal remains intermingled. The remains were chiefly hippopotamus, with some elephant, but no sign was seen of stag or corresponding smaller mammal, with the exception of one vertebra unidentified. The trench, however, was more in the nature of a shaft, and the variety of the remains found cannot be taken as conclusive.

At a depth of 14 feet the work had to be abandoned, the dimensions and size of boulders being such as to preclude progress in the time available. The animal remains were fully mineralized and blackened, and apparently corresponded to those in the breccia deposit of the cave.

A further trench was dug on a lower level at a distance of 85 feet from the entrance with a view to picking up the stratification (Fig. 6). At a depth of 2 feet a foundation of a building with a torba beaten floor was uncovered, with numerous Roman or Punic potsherds in the *débris*. The level of this floor is about 11 feet above the Wied, so we may conclude that at least 2,000 years ago there was no question of flooding at this level. A layer about 5 feet thick of torba, free from earthly matter and containing no organic remains, covered the rock bottom, which was reached at a level of about 23 feet below the floor sill. This corresponds to the level of rock bottom in the cave, so we may infer that the bed of the cave and of the approach are more or less uniformly level, and that there is no rock sill to the cave proper. The heavy deposit of boulders met with in the trench under the overhanging entrance is no doubt the result of continual breaking away of the arch, and has served to retain the deposits within the cave. The configuration of the haunches of the entrance is such that there is

insufficient cover for the entrance itself ever to have been more than 20 or 30 feet in advance of the present line.

The rock bottom of the Wied was checked from the depth of an old well opposite, which showed a trickle of running water on the rock floor. This rock bottom is some 2 feet above sea-level and about 22 feet below the cave floor.

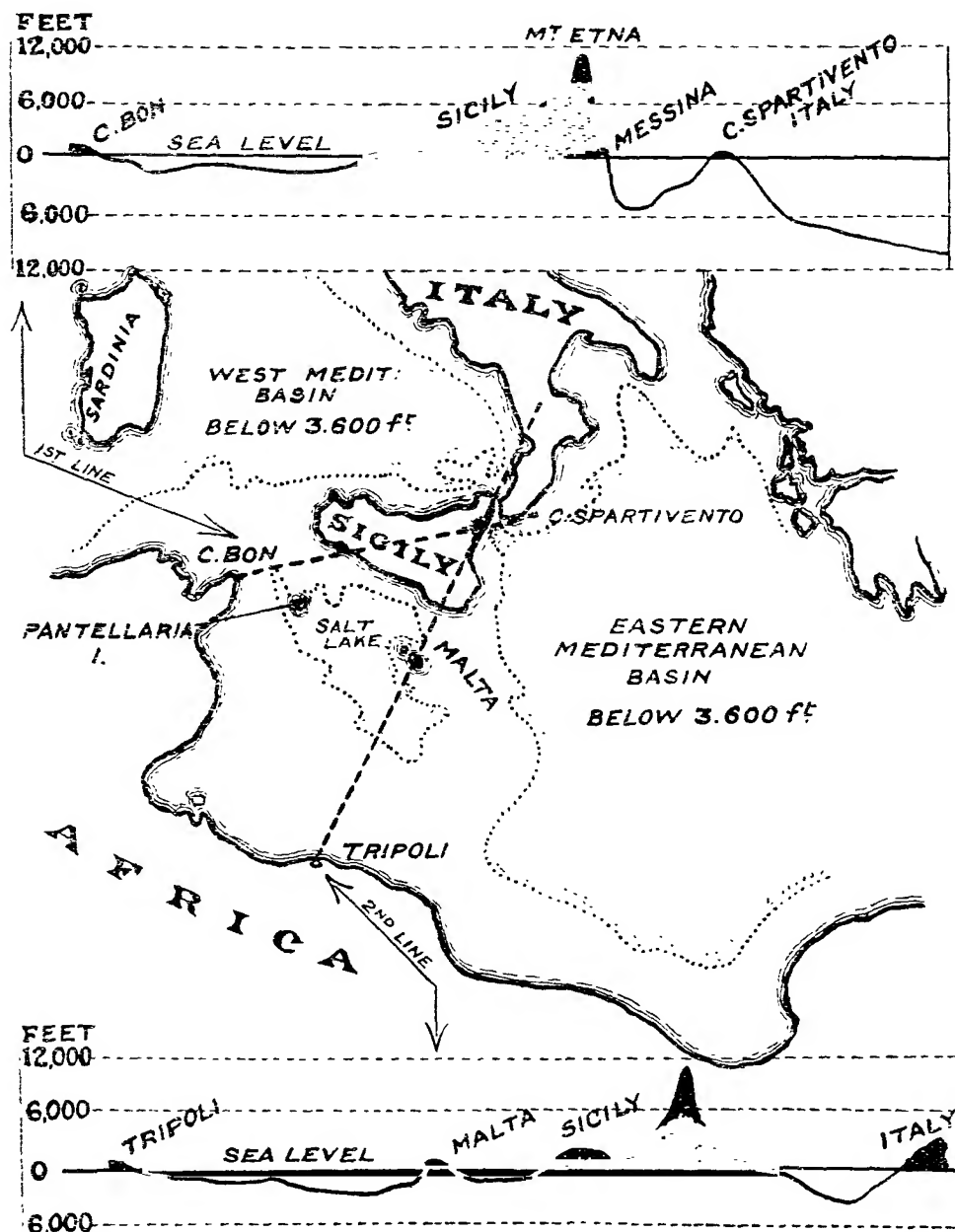


FIG. 5.—LAND BRIDGE WHICH COMES INTO BEING, WITH AN ELEVATION OF 600 FATHOMS. SECTIONS ARE SHOWN OF THE PRESENT SEAFLOOR AND SHORES.

Cave Deposits.

The longitudinal section (Fig. 6) shows the extent to which the cave deposits have already been excavated, and an attempt has been made to co-ordinate the strata, taken as far as possible from the sample pillars left *in situ* and also shown on Fig. 7.

Taking into account the magnitude of the cave and the conditions under which the deposits were made, the strata are sufficiently uniform to permit of an attempt being made to group them.

The rock floor of the cave was found to be practically level throughout, and the deposits, varying in thickness in different parts, may be summarized as follows:—

(1) Sterile layers of yellowish-blue clay, about 3 feet deep, which covered the whole rock floor as far as it has been excavated: it is a slightly stratified dense layer of plastic clay, entirely free from animal remains. It represents a long period of time when the cave was flooded with water heavily charged with silt. The deposit is singularly even and well-defined, and little change seems to have occurred in the physical conditions during its deposit, unless the slight stratification of the blue and yellow clays represent periodical modification in the flooded conditions. The upper skin of the clay deposit is hardened into a cake about 1 inch thick, forming a sufficiently hard floor for foothold for the animals which were afterwards to frequent it.

(2) *Bone Breccia*, including the overlying rounded boulder layer.

The breccia stratum, about 3 feet in depth, is at once the most interesting and, in a way, the most disappointing of the cave deposits. It is so dense and hard in places that only occasional fragments can be identified. Where it is free from stalagmitic infiltration the animal remains can be isolated more or less and present many curious features. In the first place, they are so numerous as to represent about 75 per cent. of the material of the stratum. They occur in utter disorder. The degree of mineralization differs; generally they are almost black in colour and intensely mineralized. The smaller pebbles which occur with them are of similar colour and weight. A large proportion of the bone fragments are rolled into pebble form, so much so that it is often difficult to decide off-hand which is bone and which is stone pebble. The remains, so far as they can be identified, are chiefly hippopotamus and elephant. The pebble-like rolling of the bones can only have been brought about by the action of water washing to and fro. Whether this occurred before or after mineralization is uncertain. They were rounded *in situ*, for the sides of the central trench in which they are contained are highly polished—just such a polish as we find in the best class of neolithic pottery, believed to have been effected with bone implements.

The bone layer marks a definite epoch quite different from the underlying and overlying deposits, and represents a long period when the cave was at least partly dried out and the climate genial, if not tropical, followed again by a prolonged period of flood or submergence. The breccia is covered by a boulder layer some 12 inches thick of large rounded pebbles and small boulders worn smooth, in the manner found

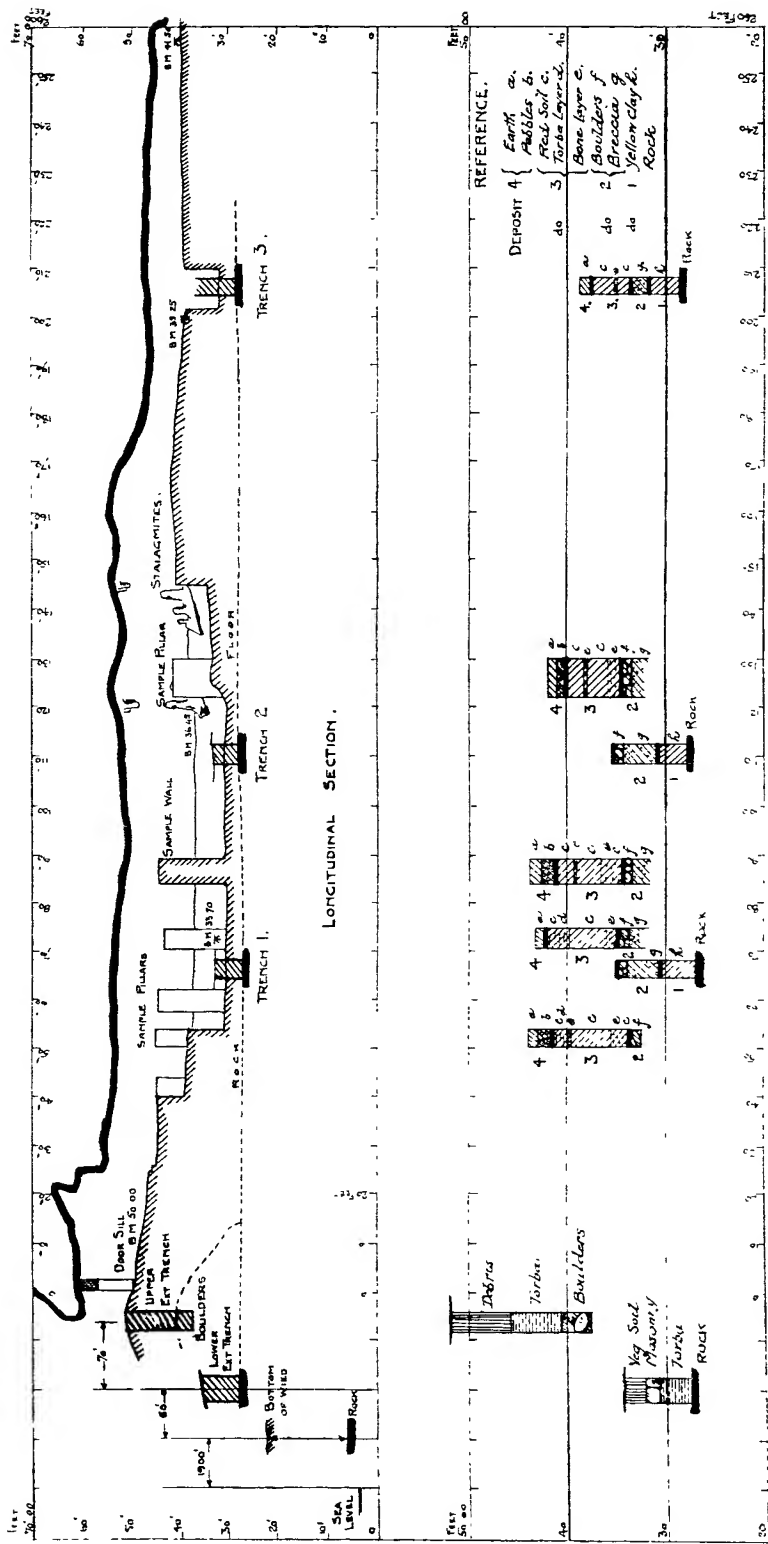


FIG. 6.—SECTION OF CAVE AND OF STRATA IN ITS FLOOR. THE POSITION OF TRENCHES AND FORMER EXCAVATIONS IS SHOWN.

on sea-beaches. The boulders were no doubt derived from the roof and walls of the cave under the action of frost.

(3) *Red Earth Layers.*

The total depth of these layers overlying the breccia is about 7 feet, and they consist chiefly of the red vegetable soil of the island, with alternating thin layers of "torba" clay in the upper portion.

The red soil is the product of disintegration of the Maltese rocks and must have been very plentiful at one time to support the tropical vegetation that no doubt existed when the elephant and hippopotamus roamed the country. "Torba" is a non-plastic earthy clay, of which extensive pleistocene deposits exist in the ground adjoining Marsa Scirocco.

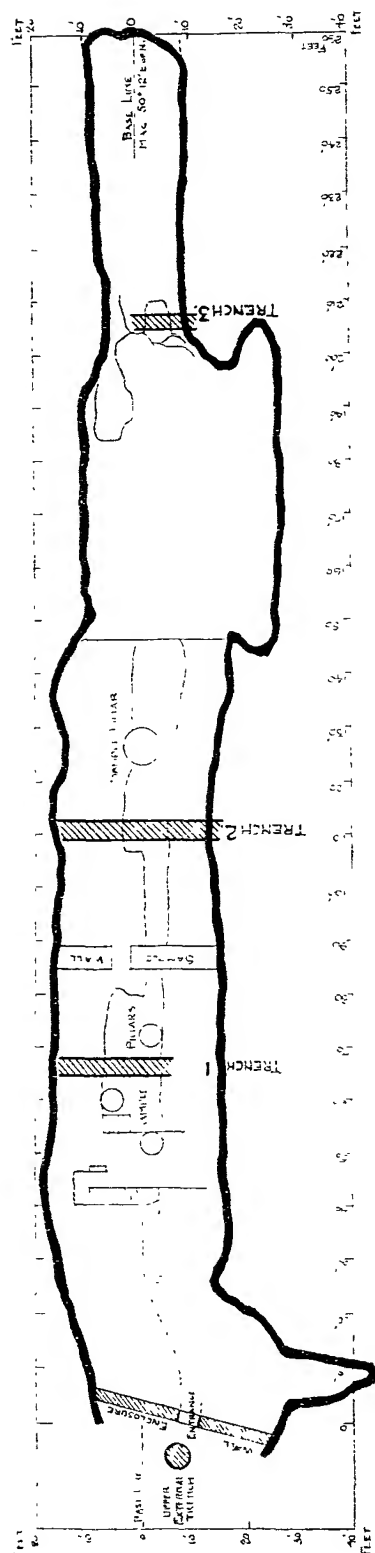
About 3 feet down in the earth layer is a well-defined bone layer a few inches thick, the principal remains being stag. A substantial bone layer occurs also at the bottom of the earth deposits, also chiefly of stag remains.

Elephant and hippopotamus remains are found in the bottom part of the earth layer, partly intermingled with the lower boulder layer. These remains are said to be in a different state of mineralization to those in the breccia, but the writer is inclined to the view that they belong to the breccia deposit, being displaced by the violence of flooding, or have been deposited and bleached on the rocky ledges, to be afterwards intermixed with the later earth deposits.

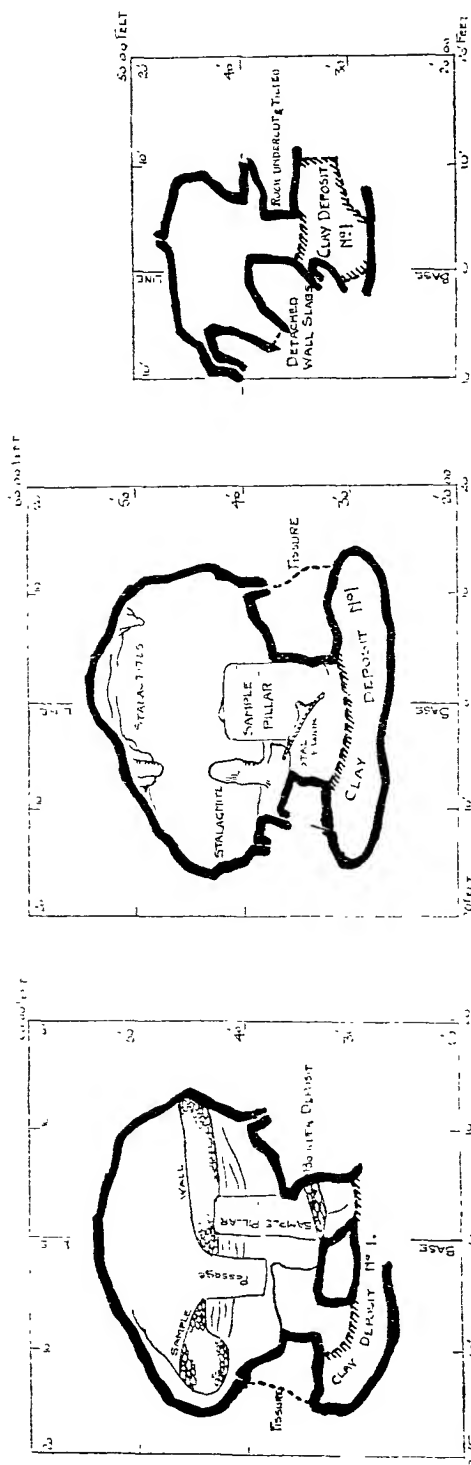
With the exception of the bone and torba layers referred to, the whole of the earth layer is remarkably uniform in character, and was evidently deposited over long periods when the cave was flooded.

(4) *Surface Layer.* consisting of the superficial boulder layer, cave floor and pebble layer under it.

The superficial boulder layer which previous investigators found strewn on the surface to a depth of 2 or 3 feet, was composed of stones rounded by natural weathering. The valley outside is plentifully strewn with such stones, and it may be that the boulders in the cave were brought in by human agency, in the Bronze Age, or perhaps earlier. The plentiful potsherds in the cave show that it was inhabited for a considerable period, and it is more than likely that the inmates built themselves rough shelter walls round their separate pitches, both for privacy and for comfort. There is no evidence of flooding of the cave since Neolithic times. The cave floor contains on the surface Phœnician and Roman remains, with Bronze Age and Neolithic potsherds in plenty, and but little deeper down. In the pebble layer under it Neolithic potsherds are fairly plentiful, with occasional flint and stone implements. This pebble layer consists of small stones closely packed together, but not rounded in the same manner as the lower boulder deposit. The stones of the pebble layer may have fallen from the roof and sides of the cave under the action of frost or may have been set as flooring by the Neolithic inhabitants.



PLAN OF CAVE.



CROSS SECTION TRENCH 1.
LOOKING INWARDS.

CROSS SECTION TRENCH 2.
LOOKING INWARDS.

CROSS SECTION TRENCH 3.
LOOKING INWARDS.

FIG. 7.—PLAN OF CAVE, WITH THREE CROSS-SECTIONS MADE AT SITES OF TRENCHES.

Neolithic potsherds have occasionally been reported from the middle part of the red earth layer. Mineralized remains of hippopotamus have, however, also been found with, and even over, such potsherds. The early excavators of the cave did not always leave precise records of where they had dug, and later evidence may be misleading on this point. The impression conveyed by a cross-section of the red earth is that it was uniformly deposited.

Before attempting to deal with the times at which these four strata have been formed it is necessary to consider the circumstances under which the cave came into existence. This in turn involves the formation of the surrounding land surface. No satisfactory explanation of the presence of the bone deposits is possible without a brief survey of the physical conditions obtaining in Malta in the pleistocene period.

Eurafrican Land Bridge.

It has long been accepted that, during recent geological times, Europe and Africa were connected by a land bridge between Sicily and Tunis, of which Malta now forms one of the few remaining links. The physiography of this bridge and its place in the chronological table is of the first importance, but no attempt seems to have been made to arrive at any definite conclusion. It may be well to remind the reader that it is 55 miles from Ghar Dalam to the nearest point of Sicily, 150 miles to the nearest point of Italy, 190 miles to the nearest point of Tripoli, and to reach the cave from Cape Bon in Tunis, the land journey being necessarily made by Sicily, 230 miles have to be traversed (*see* Fig. 5).

The following notes are put forward in the nature of a first suggestion towards the production of a working hypothesis.

Period of Elevation.

The basis of any study of the land bridge must of necessity be made on the soundings of the published Admiralty charts.

Whether the land rose or the sea fell is of minor importance as regards Malta, although it might be all-important in dealing with a large continental area where land elevation was not likely to be so uniform as a depression of sea-level would be. It is proposed to treat the difference in levels of the Mediterranean as being uniform, ignoring faults and change of dip. This sea may be roughly divided into two great basins east and west, each having stupendous depths of over 2,000 fathoms,¹ divided by relatively shallow water between Sicily and Africa.

Professor Hull mentions a possible elevation of 300 feet, but 300 fathoms, or 1,800 feet, would be necessary even to connect the two continents and leave some margin over. Professor James Geikie's estimate of 3,000 feet must be much nearer a true estimate.

¹ 12,000 feet (3,700 metres).

Only a minimum elevation of 600 fathoms will give a satisfactory explanation of all the land changes which have affected the whole Mediterranean basin, connecting Spain and Morocco: the Balearic Islands with Spain: Sardinia and Corsica with Italy: Tunis with Sicily and Italy: drain the Adriatic and the Ægean, except for some isolated lakes; and connect Cyprus with Asia Minor. The north coast of Africa, if raised 600 fathoms, would not be affected materially except at the land bridges to Sicily and Gibraltar. This elevation of 600 fathoms, or 3,600 feet, may be a little over the mark, but for the present argument it is proposed to adopt it. The higher land in Malta to-day is about 700 feet above sea-level, so that, if no allowance is made for subsequent denudation, the highest peak of land bridge would have been some 4,300 feet O.D., but the greater portion of the bridge would have been much lower. Ghar Dalam was situated on the shoulder of this ancient peak.

The Maltese rock series had its origin in Miocene marine formations, involving a steady elevation above the surrounding sea. Now one of the most striking physical features of Malta is the denudation of the eastern half of the island, where strata, having a total thickness of 400 feet, have been worn away. The limit of denudation is sharply defined and the division runs practically north and south. The possibility of direct glacial action must be dismissed, and everything points to marine agencies, modified, of course, by sub-aerial erosion over a long period of time. Professor Leith Adams, who did an immense amount of pioneer geological work in Malta, held this view about 1860, and was of opinion that denudation was the work of a secondary depression below sea-level. The erosion may have taken place as the plateau of land, the remains of which now forms Malta, rose gradually above the sea. The rock perhaps had a much less degree of hardness than to-day: it was open to the full force of storms from the eastern Mediterranean basin, and erosion being assisted by the gentle dip of the strata, we have a very satisfactory explanation of the present form and character of the eastern half of Malta. The present remaining high land in Malta would have been sheltered from the west by high ground extending west of Gozo, which no doubt has been greatly reduced in area, the cliffs standing some 400 feet above the sea. We are assuming, therefore, that Wied Dalam was fully formed during the early stages of the elevation of Malta, and it is probable that Ghar Dalam also was formed at the same time, ages before any of the present cave deposits were laid down. The rock floor of the Wied was lowered some 20 feet below the rock floor of cave probably at some subsequent period.

Fig. 5 shows in outline the extent of the land bridge based on the 600-fathom contour. One of the striking features of this reconstruction is the great inland depression between Malta and Africa, extending some 200 miles long and from 40 to 100 miles wide. This depression (Fig. 5, salt lake) must have drained a great portion of the northern coast of Africa and southern slopes of Sicily, and was cut off from both east and west Mediterranean basins. It covers a large proportion of the whole area of the bridge. The western lip of the depression, between Sicily and Tunis, over

which the water contained in the depression would flow to the western Mediterranean basin, lies at a depth of 197 fathoms, and soundings westward indicate a tortuous channel leading into the western basin, as if at some time a great stream had flowed over this lip. It is 80 miles from Cape Bon in Tunis to Sicily. Unfortunately, the soundings at the eastern lip are not so numerous. This lip is between Malta and Tripoli, at a depth of about 250 fathoms. No additional soundings are available to show whether a stream overflowing this lip formed a channel into the eastern basin or whether the true lip was at a higher level seaward. When the eastern basin broke through into the depression, very substantial erosion of the sea bottom may have taken place. Had this erosion amounted to as much as 50 fathoms, making a contour of the original depression at the 200-fathom line, it would account for the normal overflow through the western lip and the formation of the western channel. In this case the depression would have been of substantially greater area than indicated on chart. In the absence of any such indication, however, we can only assume that the actual lip was at the 250-fathom line, so that this depth gives the limiting area of the lake enclosed in the depression.

During the elevation of the land bridge the depression must have been left filled with salt water. If the rainfall greatly exceeded the evaporation over a long period of time, causing a continual overflow, the salinity may have been reduced to vanishing point. With greater evaporation the salinity would be increased with a corresponding reduction in the area of the lake. A large area of land drained into this lake.

Ghar Dalam is situated in a deep, rocky valley discharging into a large land-locked harbour known as Marsa Scirocco, as shown on Fig. 2 in the preceding part of this communication. Before the present investigation was undertaken, Mr. C. Rizzo, an eminent Maltese geologist, had already formed the opinion that this harbour represented what is left of a large fresh-water lake. Certainly the configuration of the adjoining country and the large drainage area agree with this suggestion, and in considering the configuration of the land bridge it is difficult to put any other interpretation on it. The seaward side of this harbour and the sea bottom have undergone a considerable amount of change during recent times, and it is not possible to define the limits of this lake during the period of maximum elevation. It is certain, however, that it was much larger than at present. The level of this lake Scirocco would have been about 250 fathoms, or 1,500 feet above the level of the great "land-bridge" lake, and the distance between them would have been only 12 miles. The contour of the great "land-bridge" lake shows an estuary heading in the direction of Marsa Scirocco, and the inference is that the two were connected by a fresh-water stream of considerable volume flowing through a chain of smaller intervening lakes. Such a disposition of land, river and lake may throw light on the bone deposits in Ghar Dalam.

One of the characteristics of the bone deposits in the breccia is the preponderance of hippopotamus remains (*H. pentlandi*). The explanation accepted hitherto is that

the carcasses were washed into the cave by floods in the adjoining valley—the Wied Dalam. This was first put forward by one of the earlier explorers of the cave and does not seem to have been challenged. If the suggestion made above as to the denudation of the eastern portion of Malta is well founded, Wied Dalam never had a greater watershed than at present. This watershed is quite inadequate to account for such violent flooding of the valley as would be necessary to drown and sweep away these animals, and there is nothing in the configuration of the valley to induce such an eddy as would cause the cave to trap the diverted floating carcasses into the cavern. Circumstantial evidence has been adduced in the wear and undercutting of the cave sides, but these are much more likely to be due to marine action, as already suggested.

If we suppose that the animals whose remains abound in the cave were driven northward from Africa by some compelling instinct, and following or guided by watercourses or rivers, they would ultimately have found themselves on the shores of the great “land-bridge” lake. This obstruction to further progress northwards would necessarily have divided the stream of immigrants, one-half turning westwards towards Sicily and the other half eastwards towards Malta. Following the eastern shore of the “land-bridge” lake, perhaps the first, or at least the first important, fresh-water stream leading northward which they encountered would have been that from Marsa Scirocco, from whence it is but a step to Ghar Dalam. We may assume therefore, that over a long period of time large herds of hippopotami frequented the lake Scirocco and its tributaries. Caves are not numerous in this area, Ghar Dalam being the only one of any size now above water in this region. To an enquiring race of immigrants the presence of the cave, probably with a flooded entrance, might soon have attracted numbers of hippopotami for the shelter it offered from a tropical sun. It might also have become the haunt to which, over a long period of time, these animals crept to die, or were pushed ashore by their companions when sick. The multitude of bones in the breccia deposit is so great that the only acceptable explanation is that the floor was paved with the trampled skeletons of animals over a very long period of time. Or is it possible that Palæolithic man in Malta, as at Solutré and Předmost, gathered the carcasses of his prey at the site of their dwellings or did they use the cave as a means of trapping their large game?

Period of Depression.

The next and more difficult problem is to attempt to fix the various stages of depression of the land bridge in chronological order, so as to connect the cave deposits with the various movements.

We have assumed a maximum elevation of 3,600 feet followed by a corresponding subsidence, and the time taken for such subsidence, if orderly, we must presume to have been very great. We cannot say, if we confine our attention to the geological records of Malta alone, whether it was a regular progression or subject to periods of

stagnation or even re-elevation. The best we can hope for is a basis on which to assess the time of the various stages in the general depression.

Where Wied Dalam enters Marsa Scirocco there is a rocky promontory extending under the sea (Fig. 4). Situated on this promontory and laid out in a properly reticulated plan is a remarkable series of bell-shaped reservoirs cut in the rock. These tanks are some 10 feet deep and 10 feet in diameter and are at present situated for the most part with nearly their whole depth under sea-level, although some exist actually under the water and some above it.

The origin and purpose of these reservoirs is obscure, but the important point is that Professor Zammit assigns them definitely to Phœnician origin, say, 2,500 years ago. Now, it may be said with certainty that, for whatever purpose these tanks were made, whether for the storage of water, grain or olive oil, not only would it have been impossible at that date for them to be carved out under water, but the porosity of the rock is such that their contents would have been rapidly spoiled in such a situation. We may assume that they were used in connection with the trade of the Phœnicians, as an important settlement can be identified in the immediate vicinity, and Marsa Scirocco was probably used as a trading base. In such a case we might expect them to be as near the shore line as possible, and if we allow the whole depth of the tank clear of the water level and a margin of 15 feet over this to allow of any submerged tanks and give some working freedom, we have a depression of 25 feet recorded during the last 2,500 years, or 1 foot in 100 years. This fact is in itself a sufficiently remarkable one to warrant attention. The depression is rapid and probably still in progress. Search has been made for some check, and two cases have been found on the other side of the island which confirm the estimated rate of depression and show it to be an even one and not a tilt.

At the head of St. Paul's Bay is a small fort bearing the arms of Grand Master Perellos and dated 1716 (Fig. 2). The outer bastion wall is now partly submerged to the extent that the sea is level with the upper edge of the lowest course of masonry.

The second case is a similar fort at Cala San Marco, where identical conditions prevail, the sea also being about level with the top of the lowest masonry course. This fort is rather more exposed than that at St. Paul's Bay, and the sea has breached the bastion wall entirely, so much so that it is reasonable to say that, had it been originally built at the present relative level, it would long since have been swept away.

In both these cases it may be assumed that master builders, like the knights, would neither have run the risk of damage by sea nor have built a single course of masonry under water, with its attendant difficulties, if, as in both these cases, all trouble and risk could have been avoided by building on higher rock a few feet further back.

The estimated rate of depression of 1 foot in 100 years would fit these two cases very well, 1 foot representing the depth of masonry and the other for margin, which,

with a beach slope of about 7° , would place the building 15 feet back from the edge of the sea.

Sir Arthur Evans¹ has produced evidence that points on both the north and south coasts of Crete have sunk about 13 feet since the Roman period—13 feet in 2,000 years. At the western extremity of Crete, however, he found evidence of land elevation amounting to 16 feet in about 2,000 years. Such observations, while in keeping with the belief that Mediterranean shore lands have been sinking in historical times, also illustrates the fact that subsidence is not uniform.

Old Sea Beaches.

At the present time geologists are concentrating their attention on signs of former land submergences (or sea elevation), which are to be detected round the shores of the Mediterranean. The raised beaches, which are the sources of our evidence of past periods of submergence, are above the sea and are thus accessible for direct investigation. Prof. Ch. Depéret, whose observations and conclusions have been accepted by Prof. Sollas (*Proc. Geolog. Soc.*, Jan. 10th, 1923; *Nature*, 1923, vol. 111, p. 332), recognizes four periods of submergence, at least three of them lying within the Pleistocene period. The most recent, the Monastirian, is marked by raised beaches, which occur about 65 feet O.D. In one of the caves near Mentone this last period of submergence is represented by a raised beach 25 feet O.D., corresponding in level to the rock floor of Ghar Dalam. Over the raised beach at Mentone are cave deposits amounting to 33 feet in depth, the bottom stratum representing the period of Mousterian culture, the rest being the Aurignacian period. We must suppose that Malta shared in the general submergence of Mediterranean lands which occurred some time before or in an early part of the period of Mousterian culture, and that the floor of Ghar Dalam in this submergence was flooded by the sea. Still older periods of submergence are represented by the Tyrrhenian (100 feet) series of beaches; older still by the Millazzian at 194 feet, in which occur traces of early Mousterian culture as well as those of the Acheulean and Chellean periods. Higher still is the Sicilian series of beaches—330 feet. Were modern Malta to be submerged 330 feet below its present level the greater part of its land with its living things would disappear below the sea. The last-named series of beaches are believed to have been formed in the cold phase which occurred in the latter part of the Pliocene.

Of much more moment for students of pre-history are the periods of land elevation which raised bridges from the bottom of the sea and thus made possible an interchange of faunas and population between Africa and Europe. The land bridges and the beaches formed during the periods of elevation, with all their traces of man and beast, lie now hundreds of feet below the sea. We can get no help in the solution of our present problem from them, for they lie beyond our reach. We have, therefore, to fall back on caves situated on these old land bridges—such as Ghar Dalam—and

¹ *Nature*, 1923, vol. 112, p. 661.

by a study of the records yielded by the deposits of their floors see what light can be thrown on the periods of land elevation, and of the migration of man and beast.

Rate of Subsidence.

At the rate of 1 foot a century it would take 360,000 years to bring the land-bridge which has been outlined above to its present point of submergence. Even if we take the minimum amount of elevation—1,200 feet—needed to connect Malta to Africa via Sicily, and allow a subsidence at the rate of 2 feet a century, it would take 60,000 years to cut Malta adrift from an African union. At the same rate it would take 25,000 years to separate Malta from Sicily and Italy, for we must suppose that the European part of the land bridge has subsided 500 feet at least. And yet geologists and prehistorians talk in the most light-hearted way about the existence of a land bridge which united Africa and Europe and served as a highway for the migration of races and cultures in the Aurignacian period, the beginning of which cannot be placed earlier, on justifiable evidence, than 20,000 B.C. Either the relative changes in sea- and land-level take place much more rapidly than we believe at present, or the inter-continental land bridge, of which Malta is a mere fragment, must have disappeared at a much earlier date than has been supposed hitherto. Somehow Neanderthal man reached Malta. Did he come by the land bridge, or was he in these early times already a sailor?

Those who have studied the fossil and animal remains of Malta and of other islands of the Mediterranean¹ find that, in the latter part of the Pliocene period, these islands must have been united to both Africa and Europe, for their fauna was similar to that of the adjacent lands. The subsidence of the land bridge and the separation which ensued towards the end of the Pliocene period must have isolated the islands of the Mediterranean for a period of long duration. The animals of the islands during this period evolved into distinctive species. Then, at one point in the Pleistocene, and apparently at one only, the Mediterranean islands again became linked to the continent, allowing forms such as the stag, the bear, wild goat, wild sheep and fox to reach Malta and other islands. It was the existence of this Pleistocene land connection, we may presume, which permitted Neanderthal man and other Pleistocene mammals to make their appearance in Malta.

The level of the rocky floor of Dalam cave and a consideration of the nature of the four strata deposited on it will help to throw some light on the Pleistocene land-bridge. The original floor of the cave is almost at the same height above the sea as the floor of the Grotte du Prince, one of the Grimaldi caves, on the shore of the Mediterranean at Mentone. On the floor of the Grimaldi cave are beach deposits 12 feet in thickness belonging to the Monastirian series, laid down by the sea during the long temperate phase which preceded the last or Würm glaciation. The deposits

¹ Dr. Forsyth Major, *Proc. Zool. Soc. Lond.*, 1901, p. 628. Prof. M. Boule, *Les Grottes de Grimaldi*, vol. 1, 1906.



FIG. 1.

DR. DESPOTT'S PHOTOGRAPH OF TEETH FOUND DURING 1917 IN
TRENCH II (110 FEET FROM THE MOUTH OF THE CAVE).

1. Distal or posterior aspect of 2nd upper molar of right side, assigned by the writer to *H. neanderthalensis*.
2. Distal aspect of 3rd upper molar of right side, almost certainly of the same individual: it is in process of development, the root portion being yet unformed.
3. 2nd upper milk molar of right side of European type (an unerupted crown).
4. Proximal (anterior) view of 2nd lower premolar of left side.
5. Proximal surface of 1st upper molar of right side (European type).
6. 7. 8. Lower molars of European types:—
 - (6) M², left lingual aspect.
 - (7) M², left labial aspect.
 - (8) M³, left labial aspect.

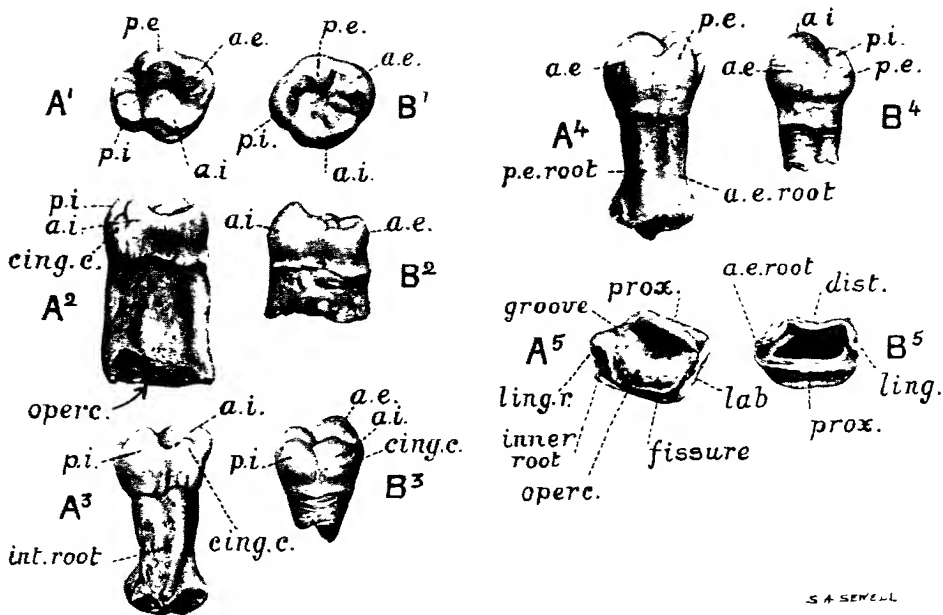


FIG. 1.

- A¹. Chewing aspect of crown of 2nd upper molar of the right side.
 B¹. Corresponding aspect of 3rd molar.
a.e., antero-external cusp.
a.i., antero-internal cusp.
p.e., postero-external cusp.
p.i., postero-internal cusp.
 A². Proximal or anterior aspect of 2nd molar.
cing. c., cingular cusp.
operc., operculum.
 Other letters as before.
 B². Corresponding aspect of 3rd molar.
 A³. Lingual inner aspect of 2nd molar: letters as before.
 B³. Lingual inner aspect of 3rd molar: letters as before.
 A⁴. Labial or outer aspect of 2nd molar: letters as before.
 B⁴. Labial or outer aspect of 3rd molar: letters as before.
 A⁵. Floor of pulp cavity or opercular aspect of 2nd molar.
 B⁵. Similar aspect of 3rd molar. The surface and roots are indicated.

which occur over this old beach contain the culture and the fauna characteristic of the Mousterian period: then over the Mousterian strata lie deep deposits of the Aurignacian period. In Ghar Dalam we have a comparable series. The stratum of bone breccia and the layer of boulders over and in the breccia have the characters of a beach-deposit: the sides of the cave are polished: fossils and stones have been rolled. The 7 feet of red cave earth is clearly a later Pleistocene deposit which has never been exposed to tidal action, and is in every way comparable to the Mousterian and Aurignacian deposits at Grimaldi. If Neanderthal man was a contemporary in Malta of the same species in Europe, then it is just in the upper levels of the bone breccia and in the lower levels of the red cave earth we should find his remains. And it is just at this level they have been found.

Further evidence in support of the simultaneous movements of the opposite shore lines of Sicily and Tunis has been published lately by M. Allemand Martin (*C. R. Acad. des Sciences*, December 26th, 1923). At Cape Bon, as in Sicily, he found the Monastirian beach at the same level—63 feet O.D. The rolled bone breccia in Ghar Dalam represents the same deposit.

At the date these strata were formed in Ghar Dalam, Malta was already and had long been an island. If Neanderthal man reached Malta at this date, then it must have been by sea and not by land. If he came by land, then he came before the Mousterian period of culture or at a very early point in the development of this culture. There was certainly no land bridge uniting Europe and Africa in the later Palæolithic periods, and if migrations of men and of cultures did take place in these periods between Africa and Europe, as very likely they may have done, they spread by boat and not on foot.

The enigma of the antiquity and duration of the Pleistocene land bridge is rendered more intricate by the evidence of at least three periods of submergence during this geological period. During the Chellean period the level of the rock floor of Ghar Dalam was at least 60 feet below the level of the Mediterranean: in pre-Chellean times it was 100 feet lower still. During these periods the cave sank, but between them were others of land elevation in which the cave rose, but whether the rise which produced the land bridge was pre-Mousterian, pre-Chellean or at a still early inter-glacial period there is no evidence to permit us to reach a decision. I believe the land-bridge came into existence about the time Mousterian culture first appeared in South Europe (A. K.).

We desire to acknowledge the willing help given to us by Prof. T. Zammit and Dr. G. Despott. In particular, one of us (G. S.) wished to acknowledge his great indebtedness to Mr. Edgar Flamingo, of Malta, who continued and completed the excavations in Ghar Dalam and who has been of much assistance in other ways.

ON THE PALÆOLITHIC DEPOSITS OF SAWMILLS, RHODESIA.

By NEVILLE JONES.

THE country between Bulawayo and the Zambesi River is particularly rich in stone implements, and the tributary rivers of the Gwai and Umguza have furnished quantities. These are for the most part hand-axes, strikingly similar to those of Chellean and Acheulian age in Europe, with which are associated other forms of rarer occurrence. Mr. A. M. McGregor, of the Geological Survey of Rhodesia, has called attention to them in a paper read before the South African Association for the Advancement of Science, and has figured some characteristic forms.¹ His list of localities does not, of course, pretend to be exhaustive, and fresh discoveries are constantly being made. The implements occur generally in beds of coarse gravel deposited by these rivers at a time when they contained much more water than they do to-day. Many of them were doubtless of considerable size, but they are now reduced to mere gullies, dry through the greater portion of the year, and flowing only during the heavy rains, when they quickly fill and as quickly dry up. The storm waters, coming down with great force, lay bare the gravel and wash away the soil, and quantities of implements may often be collected in favourable spots. So far as I am aware, these implements may all be referred to the older palæolithic, and, as some of them have been found in association with mammalian remains, it is by no means unlikely that human remains may also ultimately be discovered. The Umguza River abounds in these implements, which may be recovered from its bed over a course of many miles. South of Bulawayo these large implements become increasingly rare until British Bechuanaland is reached, when similar types in equal abundance are found. The later palæolithic is represented in Rhodesia by implements found in the caves of the Matopo Hills and in superficial deposits in various places. In view of the similarity of the implements from both these sources it has hitherto been convenient to regard them as having been made by the Bushman, who was undoubtedly the maker of the Cave implements. They are all flake-implements of Aurignacian facies.

Apart from these two definitely demarcated periods of human habitation, no satisfying evidence has yet been forthcoming of any previous or intermediate one. The well-known palæoliths of the Victoria Falls are, it is generally accepted, of very great antiquity, since they appear to have been deposited in river gravels laid down prior to the excavation of the deep gorge which begins at the Falls and continues

¹ *S.A. Journal of Science*, vol. xvii, No. 2, April, 1921, pp. 230-235.

many miles to the east of them,¹ and it is quite possible that these implements are of greater age than many of those found occurring in the more distant tributary valleys. In all the known localities a very wide range of technique is, however, apparent, and it would be presumptuous to attempt to correlate any of the assemblages with any European culture. Between the early stone-age man and the Bushman there is a gap that we have not as yet been able to bridge, though it may be that the gap is not so great as it would appear to be if the first occupation of South Africa by the Bushman is as remote as some think it is.

The implements ascribed to the later culture are of Aurignacian type, and no hand-axes are found in association with them, and while it is possible that there were in Rhodesia two distinct races, the Bushman race and an earlier one, both of which fashioned generally-similar implements, no conclusive evidence on the point can be produced.

In many of the localities, in which are found the large hand-axes, small flakes are found commonly in association. While some of these are doubtless simple flakes struck off in the manufacture of the hand-axes, others give unmistakeable evidence of design, and exhibit secondary chipping. This is particularly the case at the Victoria Falls, and Mr. Maufe² has found similar conditions obtaining in the Gwampa Valley. In these two localities both classes of implements are associated, and there is no evidence at present available which would lead us to a definite conclusion as to whether they were contemporary or whether they indicate two distinct periods. The special interest attaching to Sawmills is, however, that we have here two distinct periods of human activity, an older and a newer, both clearly separable by geological methods, and admitting of investigation under the most favourable conditions; I know of no other locality in Rhodesia where this is possible.

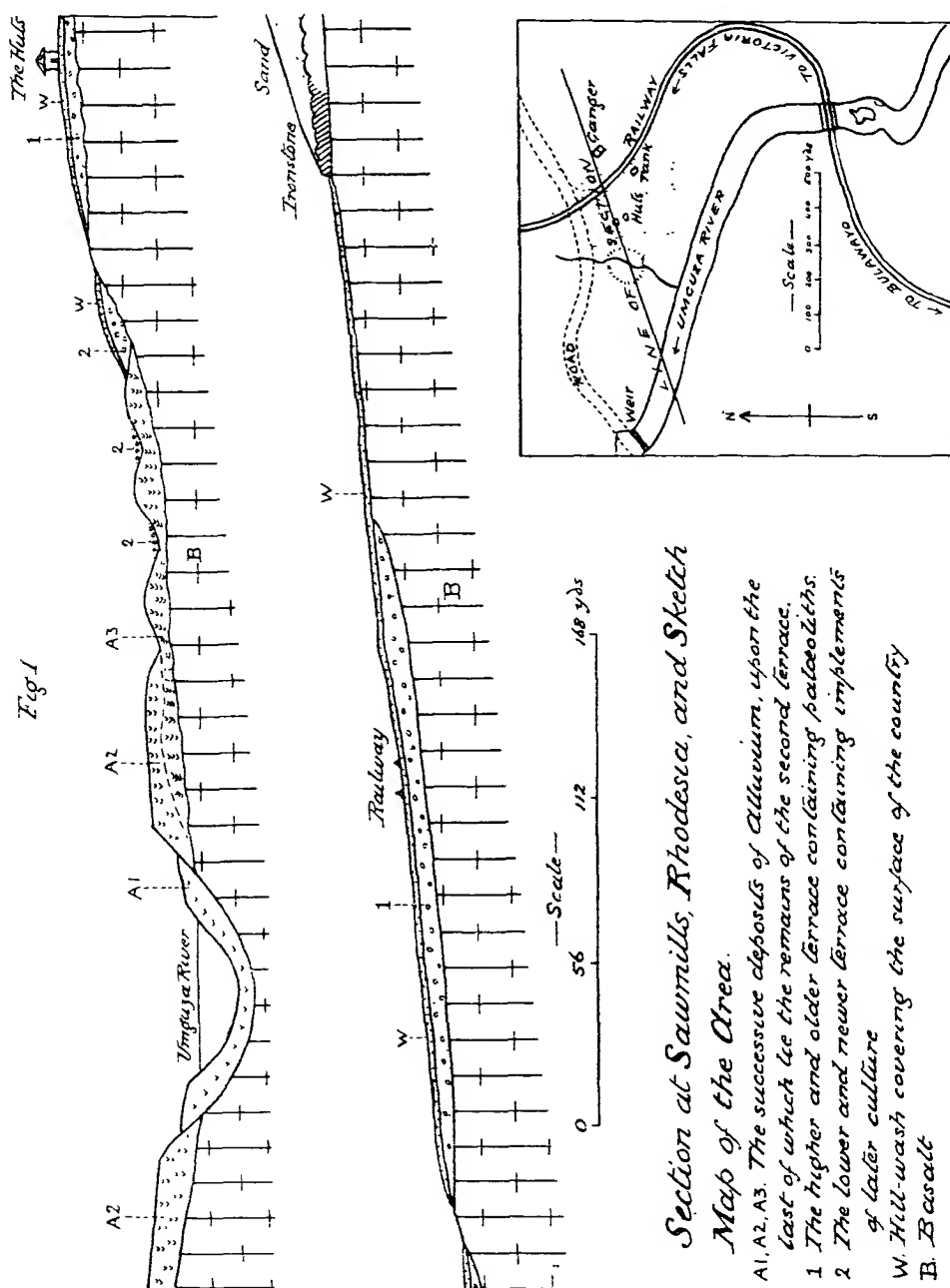
Sawmills is a station in the Teak Forest on the Bulawayo-Victoria Falls Railway, 55 miles north-west of Bulawayo. Soon after leaving Bulawayo the railway runs for some miles along the Unguza Valley and, just below Sawmills, crosses the river to its right bank, on which the station is situated. The special interest attached to the insect fauna has made the spot famous in the annals of Entomology, and my friend, Dr. Arnold, the Director of the Rhodesia Museum, makes occasional trips there for collecting purposes. To Dr. Arnold belongs the credit of the discovery of the special archaeological interest of the locality, to which I have been privileged to pay three visits as his guest. During these visits I have subjected the implement-bearing deposits to close examination, and having, I believe, exhausted the varying types they are likely to yield, am in the position of being able to summarize them.

The accompanying section, for which I am indebted to Dr. Arnold, will make apparent the surface geology of the locality (Fig. 1). Between the railway and the

¹ See Lamplugh and Balfour, *Journal of the Royal Anthropological Institute*, vol. xxvi, 1906, pp. 159-171.

² *Proceedings of the Rhodesia Scientific Association*, vol. xx, June, 1921-June, 1922, p. 7.

Umguzu River. on the rising ground, are the huts of the Sipopoma Club, built on a bed of coarse gravel containing many large, irregular, water-worn pebbles of various hard rocks. This gravel is exposed here and there on the higher ground where the hill-wash has been denuded, and contains hand-axes, both of pointed and oval form,



all much rolled and often difficult to recognize on that account. These are all of hard fine-grained quartzite, to which the term "silerete" would perhaps preferably be applied, as it is considered to have been atmospherically formed. Some of the hand-axes are of very crude workmanship and exhibit all the characteristics of early Chellean forms, but a small proportion show a greater degree of skill. The gravel in some places extends to within a few yards of the river bank, where it can be seen as small outliers occupying the higher ground. With the implements are numerous water-worn flakes of various hard rocks, which are for the most part very crude and formless. From the implements collected I have made a typical selection.

Figs. 2 and 3 illustrate the various types. The hand-axes (Fig. 2, Nos. 1 and 2, and Fig. 3, No. 1) are of silcrete and are much rolled. The chipping is crude and the outline irregular, and in some cases a portion of the original crust of the pebble from which the implement was made is to be seen on some part of its surface. Obviously the most conveniently-shaped pebbles were used, and as little work as necessary put into them to render them serviceable. In Fig. 3, No. 2, we have a more highly finished form. It is generally symmetrical in shape and has been trimmed to a thickness of $\frac{3}{4}$ inch, and is well worked on both sides. In Fig. 2, Nos. 3 and 4, and Fig. 3, Nos. 4 and 5, I have figured four scrapers, of which No. 4 (Fig. 3), of chalcedony, has a patina strikingly resembling that of the Victoria Falls implements. The backs of all these are unworked, and exhibit the plain flake-surface with bulb of percussion. Fig. 3, No. 6, is possibly a fabricating implement and is roughly trimmed on both sides.

The path from the huts to the river, after crossing the old river gravel and an outcrop of basalt, descends into an area of rain-washed hummocks and intervening gullies, bare of vegetation except for a few scrubby bushes. The sandy hill-wash that covers the surrounding country has here been removed by converging rain-water, and the old alluvium of the river is thus exposed. On the surface of this alluvium the river once deposited a bed of gravel of varying thickness and consisting of materials evidently largely derived from the older terrace, as evidence of which I have found in it a much worn hand-axe of the older gravel. This newer gravel, a great part of which has been washed away, is thickest at the top of the declivity, and thins out towards the river, but remnants of it are scattered over the whole of the area. Owing to its local occurrence and limited extent, I prefer to regard this gravel, not as a distinct second terrace, but as a small deposit left by the river in a kind of bay, possibly at a point at which the course of the river was diverted, a condition frequently to be noted in the present bed.

In this deposit is a great number of small and large pebbles, many of which are banded agates of considerable beauty, and intermingled with these are chips of silcrete and chalcedony of obvious human workmanship, in great profusion. Good implements are to be found by careful searching. The fresh and unworn condition of the chips, the frequent association of chips of similar materials, and the number of

implements clearly broken during the process of manufacture, lead to the definite conclusion that the chipping was done *in situ*. It is, in fact, a factory site where, at a period subsequent to the deposition of the older gravel, a newer race of stone-workers sat and split the rough silicious pebbles they found there, fashioning

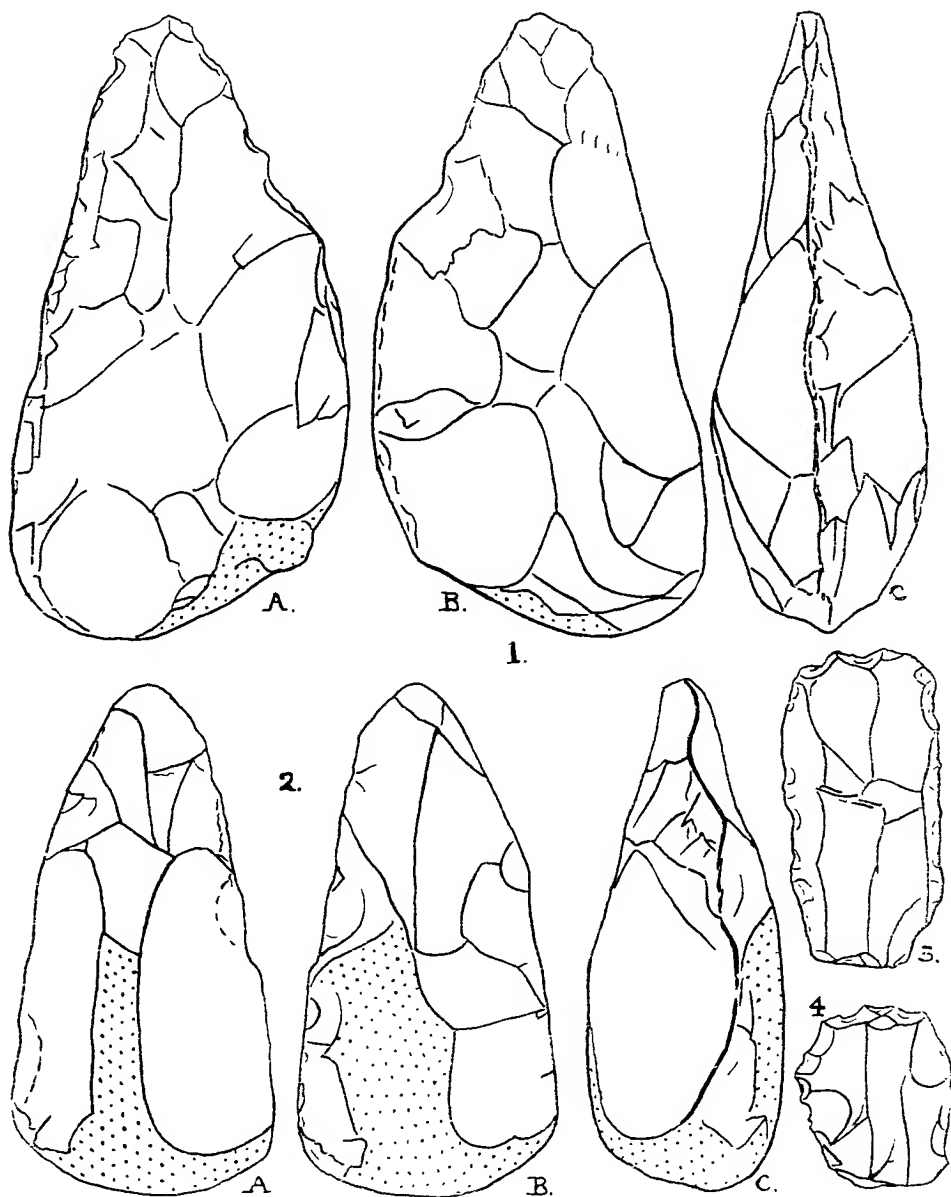


FIG. 2.—IMPLEMENTS FROM THE OLDER TERRACE.

1 and 2. Hand-axes in silicrete, showing both sides and an edge (the dotted areas indicate the unworked pebble surface). 3 and 4. Scrapers with plain flake surface on under side.

implements with a degree of skill unknown to the earlier race. As might be expected, the number of perfectly-fashioned implements, *i.e.*, those of recognizable form and exhibiting some degree of secondary chipping, is small as compared with the broken ones, and many even of those which might be regarded as perfect exhibit flaws, for which reason they were probably discarded.

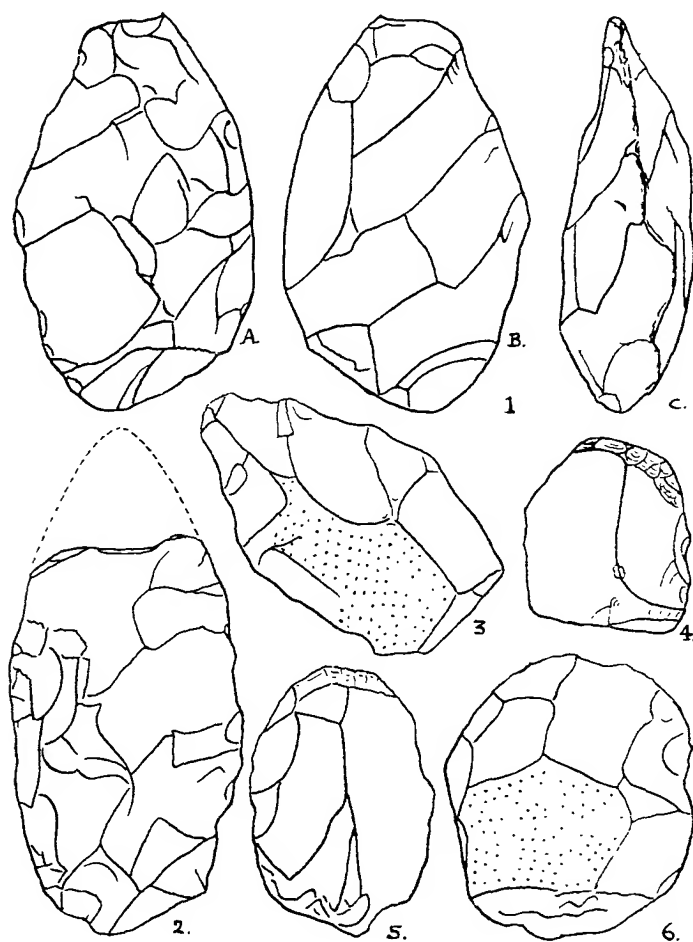


FIG. 3.—IMPLEMENTS FROM THE OLDER TERRACE.

- 1 (A, B and C). Small hand-axe. 2. Thin implement with point broken.
3. Crude chipped *pointe*. 4 and 5. Scrapers (4 is of highly-polished
chalcedony). 6. Fabricating implement. $\times \frac{3}{4}$.

Fashioned of various forms of silica and of many bright colours, these implements form a beautiful series, to which no method of illustration other than lithography can do justice. They are worked on one side only, and very rarely on both sides, with an exquisitely fine retouch, and careful choice was obviously made of the pieces used.

The method of manufacture was by the selection of a suitable pebble and working it into a "tortoise core," from which the required flake was struck off. The cores shown in Fig. 4 are more shapely than most, and well-made cores are comparatively rare, so much so that one is inclined to the belief that many implements were made

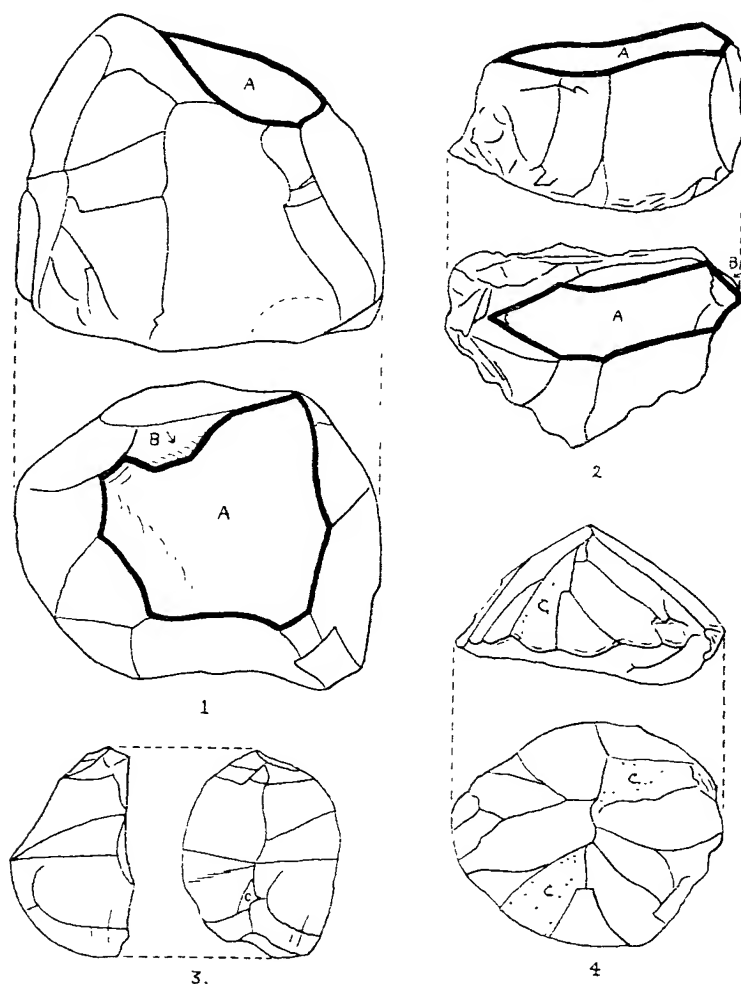


FIG. 4.—SILCRETE CORES.

The thicker lines indicate the areas from which implement flakes have been removed (3 and 4 are intact). Dotted areas indicate the original crust. . †.

from flakes struck off without previous preparation of a core. When a suitable flake was obtained it was trimmed by a neat retouch.

The most abundant form is the "fabricator," a selection of which is shown in Fig. 5. They are generally similar in design. The edge is irregular and frequently abraded. While one side generally exhibits the original flake surface, which is

roughly trimmed to secure a strong blunt edge. the other side is more carefully worked. but the original crust of the pebble is seldom entirely removed. These fabricators are most numerous in chalcedony and banded agate. which latter material was seldom employed for specialized implements, probably on account of its tendency to fracture badly. Silcrete forms are also found. I think there can be little doubt as to the use of these implements, and, indeed, it would be difficult to imagine a use for them other than the fabrication of implements.

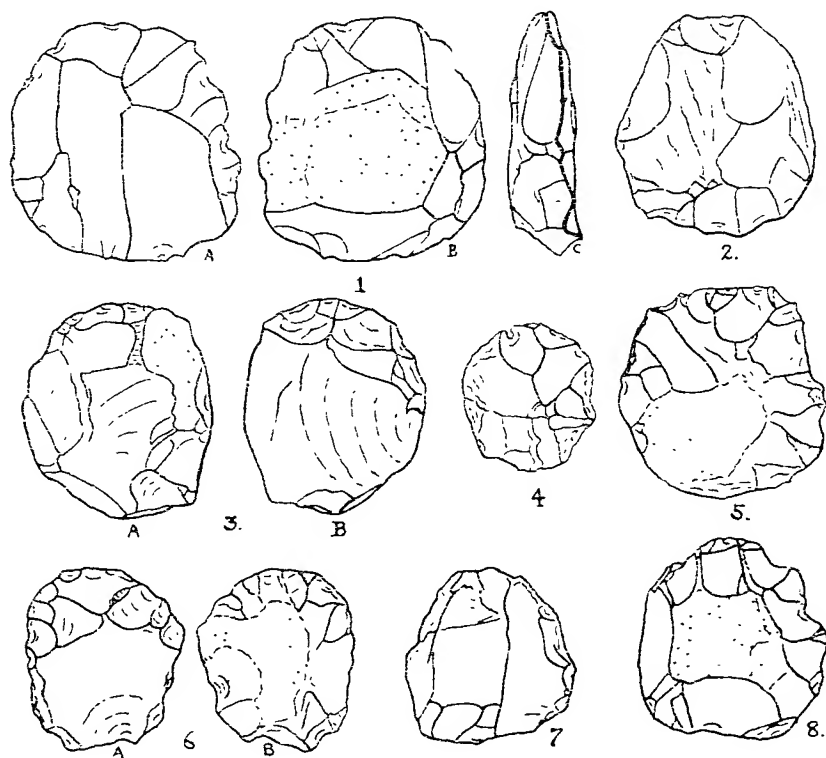


FIG. 5.—FABRICATING IMPLEMENTS.

1 is of silcrete. 2, 3 and 7 of banded agate. 4 and 5 of chalcedony. 6 and 8 of jasper. 3.

The crescentic scraper is the *chef-d'œuvre* of the culture, and exhibits the highest skill in retouch. Fig. 6 shows the various forms. The retouch may be either gently rounded, as in No. 7, or steep, as in No. 8, where it is almost vertical. Chalcedony is the only material used in manufacturing this form.

Fig. 7 shows a variety of characteristic implements. The burin, No. 2, is remarkable for its similarity to the lateral burins of Aurignacian times. A longitudinal flake has been struck off one side, so as to obtain a sharp working point at

the apex of the dressed edge. Nos. 1 and 3 were evidently intended for similar use, but are intact. These are the only burins I have found, nor have I met with the type elsewhere in Africa.

Various forms of grattoir are shown in Fig. 7. and of them No. 6 is perhaps the commonest type. The racloir, No. 8, the only one of its kind, is a beautiful implement. Of the *pointes*, Nos. 10, 11 and 12, the first is noteworthy as having been worked on both surfaces. The microliths, Nos. 14 to 17, so strongly reminiscent

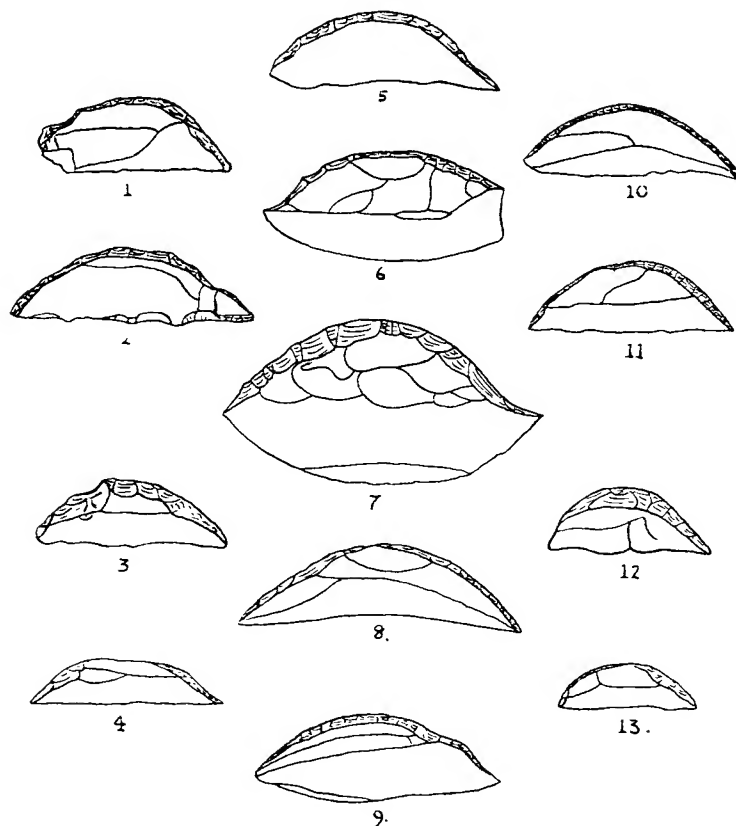


FIG. 6.—CHALCEDONY CRESCENTIC SCRAPERS OF VARIOUS TYPES.
(Actual size.)

of the "Gravette pointe," have a very delicate and almost vertical retouch, and No. 15 has this retouch on both edges.

By whom were these implements made? Though some strongly incline to the opinion that they were the work of the early Bushman, personally I prefer to leave the question an open one. Many of the forms are to be found in undoubted Bushman deposits, and we are continually finding implements in the caves of the Matopo Hills that are a surprising revelation of the skill of the Bushman as a stone-worker. The short, blunt grattoir, the worked *pointe*, the crescentic scraper, are all to be found,

and of a quality that will bear comparison with the Sawmills implements, though generally the undoubted Bushman implements are smaller, and lack the same definiteness in form and the same certainty in retouch. There may possibly have been a time when the Bushman possessed a greater degree of skill—a time probably coincident with his arrival in South Africa, from which his gradual degeneration dates—and if this was the case he may have made the Sawmills implements. The present-day Bushman has, it is well known, practically lost the art of working in stone, and is content with any fragments without regard to their special suitability.

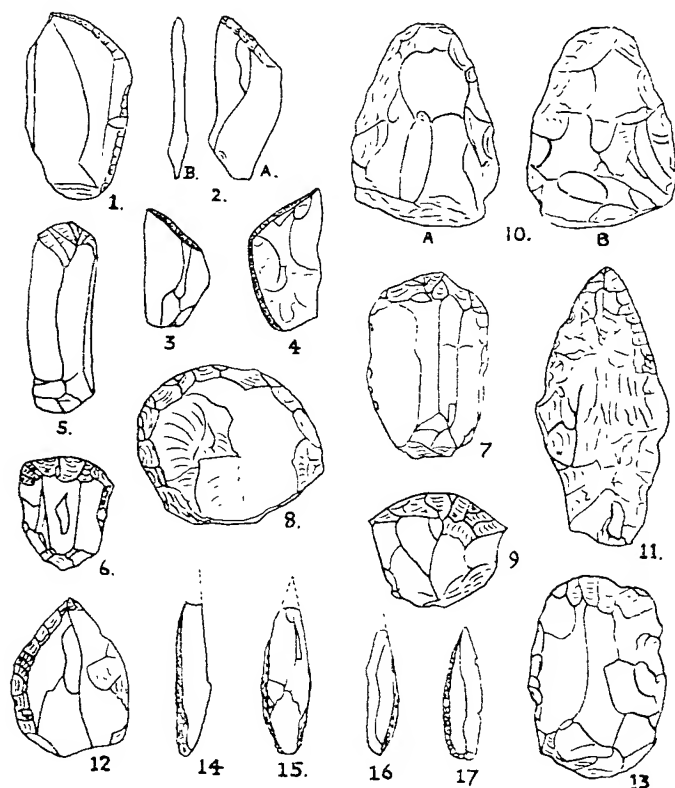


FIG. 7. VARIOUS SMALL IMPLEMENTS FROM THE NEWER GRAVEL.

1, 3 and 4. Burins. 2. Lateral burin. 5. Grattoir. 6, 7, 8 and 13. Racloirs. 9. Eared grattoir. 10, 11, and 12. Worked *pointes* (10 is worked on both sides). 14, 15, 16 and 17. Microliths. All are of chaledony with the exception of No. 7, which is of jasper. 3.

The similarity of the series, as a whole, to the Aurignacian forms of Europe is, of course, most striking, and if it were safe to assume the origin of the Bushman from a branch of this race, purely on the character of the implements he fashioned, the Sawmills series would afford substantial evidence. On the other hand, it is also possible that an earlier race made them, and the Bushman might conceivably have obtained his knowledge of stone-craft from that source. But, so far as present

research has carried us in South Africa, we are here in the realm of pure conjecture, and can for the moment hope for no more than the privilege of accumulating such information as we can obtain, and such material as we can collect, for the benefit of future investigators into the problems connected with the early history of the human race in the sub-continent.

In conclusion, I desire to express my thanks to Mr. H. B. Maufe, Director of the Geological Survey of Rhodesia, for reading my manuscript, and for his valued suggestions.

COMMUNICATIONS FROM THE ANTHROPOMETRIC LABORATORY
OF THE UNIVERSITY OF ABERDEEN.

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I.—RELATION BETWEEN STATURE, HEAD LENGTH, AND HEAD BREADTH OF
847 NATIVES OF THE NORTH-EAST OF SCOTLAND.

SINCE the year 1896 anthropometric measurements have been carried out on 1,790 medical students attending Aberdeen University.

These measurements were made in the Anthropometric Laboratory of the University by Professor Reid and his assistants.

The statistics thus obtained were being analysed, and the investigation recorded in this communication was undertaken in order to determine how far the head length and head breadth of man was related to his stature.

It was decided to choose from the register of the University Laboratory the records of male students whose parents had been born in an area of the north-east of Scotland, comprising the counties of Nairn, Elgin, Banff, Aberdeen, Kincardine, Forfar and Fife.

With this restriction it was found that less than half of the total number of students measured was available, and that their ages varied from 16 to 38 years. Table I shows the frequency-distribution for age within these limits.

The material having been selected, it was first necessary to eliminate the effect of age on the characters to be investigated when attempting to find the correlations between them.

Unfortunately, as was seen from looking at the age frequency-distribution, there was found to be such a crowding of the cases towards one end of the distribution that it was impossible to obtain a true measure of the correlations involving age by finding the correlation coefficients.¹

The correlation coefficient for the special case of age and stature was found to be $\cdot07 \pm \cdot02$, and was compared with the following measures of correlation:—

Correlation ratio² for stature and age from—

(a) Means of ages $\cdot17 \pm \cdot02$

(b) Means of statures $\cdot12 \pm \cdot02$

Coefficient of contingency³ for stature and age $\cdot19$

The correlation coefficient was evidently not in agreement with the other measures of correlation, and consequently there was left the choice of applying the method of partial contingency⁴ to the study of the problem, or of separating the material into age groups.

The latter procedure was adopted, as it alone could give results directly comparable with statistics obtainable from other sources.⁵

The whole material was divided into four groups, as may be seen from Tables II, III and IV, but the records of the 16-year-old students were discarded as forming too small a group when they were taken by themselves, and as unsuitable for inclusion in the 17-year group.

The degree of interdependence of head measurements and stature was determined by working out the corresponding partial correlation coefficients.⁶

A correlation coefficient may vary in magnitude from 1 through zero to -1 . The positive values indicate that as the one character increases, the other also tends to increase, the negative values indicating that, as the one increases, the other tends to diminish, zero indicating that there is no connection between the two variables.

The partial correlation coefficient for stature and head length is the correlation coefficient for these characters when head breadth is constant, and the partial

¹ Pearson, Karl, "Regression, Heredity and Panmixia," *Phil. Trans. Roy. Soc.*, 1896, vol. clxxxvii, A, 253.

² Pearson, Karl, "On the Theory of Skew-Correlation and Non-Linear Regression," *Drapers Company Research Memoirs, Biometric Series*, vol. ii, p. 9 *et seq.*

³ Pearson, Karl, "On the Theory of Contingency and its Relation to Association and Normal Correlation," *Drapers Company Research Memoirs, Biometric Series*, vol. i, 1904.

⁴ Pearson, Karl, "On the General Theory of Multiple Contingency, with Special Reference to Partial Contingency," *Biometrika*, 1915-1917, vol. xi, p. 145 *et seq.*

⁵ Macdonell, W. B., "On Criminal Anthropometry and the Identification of Criminals," *Biometrika*, 1901-1902, vol. i, p. 188. Tocher, J. F., *The Anthropometric Characteristics of the inmates of Asylums of Scotland, 1906-1907*, vol. v, p. 514. Schuster, E., *First Results from the Oxford Anthropometric Laboratory, 1911-1912*, vol. viii, p. 51.

⁶ Yule, G. U., "On the Theory of Correlation for any number of Variables treated by a New System of Notation," *Proc. Roy. Soc., Series A*, vol. lxxix, 1907, p. 182.

correlation coefficient for stature and head breadth has a similar meaning, head length being the constant character.

It became evident from an examination of Table II that there was for each age a distinct positive correlation between head length and stature, *i.e.*, as stature increased head length also tended to increase.

On taking into account the probable errors for the correlation coefficients, it was apparent that there was no significant difference between the coefficients for the several age groups when the 19 and 20-year group was omitted, this group having been shown by calculation to yield a maximum significant difference of $\cdot 05$ from the other groups.

In a recent private communication to Professor Reid, Dr. Brownlee made the following interesting statement :—

“ With regard to the question of head length and stature, my opinion is based upon the figures given by Mr. Tocher in *Biometrika*, vol. iv, p. 311, from which long ago I made some calculations, which might be repeated with your data.

“ When the head length and head breadth are correlated the correlation coefficient is equal to $\cdot 50$, the head length and stature equal to $\cdot 32$ and the head breadth and stature equal to $\cdot 20$. When, however, the head breadth is correlated with stature, keeping the length constant, the partial correlation coefficient obtained is practically zero, whereas when the head length is correlated with stature keeping the breadth constant, the correlation is still $\cdot \cdot 27$.

“ In other words a determining factor in the head length seems to be the stature, while the breadth seems to depend on the conformation of the skull itself.”

The general average obtained from the partial coefficients for stature and head length given by the north-east of Scotland figures was $\cdot \cdot 28$, which agreed very closely with Dr. Brownlee's value of $\cdot \cdot 27$.

Similar results have been obtained in the Oxford Anthropometric Laboratory.¹ The average value of the correlation coefficients for stature and head length in the Oxford age groups was $\cdot \cdot 31$, as against the $\cdot \cdot 30$ of the present paper—a very close approximation indeed.

From an examination of Table III it was seen that on finding the partial correlation coefficients the lowness of the value for the 19 and 20-year group was emphasized.

Unfortunately the Oxford results do not give the correlation coefficient for head length and head breadth, and it was therefore impossible to calculate the partial correlation coefficients for stature and head length and stature and head breadth.

¹ Schuster, E., *First Results from the Oxford Anthropometric Laboratory*, 1911-12, vol. viii, p. 51.

Macdonell gives interesting results¹ obtained from measurements of 1,000 Cambridge Undergraduates,¹ and on working out the partial correlation coefficient for stature and head length from his figures we found a value of $\div \cdot 25$.

We turned now to the partial correlation between stature and head breadth and discovered that with the exception of the 17-year-old group its value was practically zero, and was thus in marked contrast to the correlation between stature and head length, as Dr. Brownlee observed.

As stated above, it was impossible to find the partial coefficients from the Oxford results: the correlation coefficient, however, was not large, being only $\div \cdot 14$.

The Cambridge figures yielded $\div \cdot 06$ for the partial coefficient, also a very small number.

In the exceptional 17-year north-east of Scotland group the partial coefficient for stature and head breadth was almost as well marked as for stature and head length.

The equations given in Table IV helped to crystallize the results already stated, and on looking at the first group, where the probable stature is given for a specific head length and a specific head breadth, it was easy to see that a unit increase in either head length or head breadth altered the stature by that fraction of a unit represented by the corresponding numerical coefficient.

It was thought desirable to find out whether there was any correlation between the shape of the head as estimated by its cephalic index, and the stature of the body to which the head belonged. Accordingly correlation tables were drawn up for each of the four age groups into which the material was divided, and the corresponding correlation coefficients obtained from them. The latter are given in Table II.

From an examination of the figures it was apparent that in the 17-year-old group there was no relation between stature and cephalic index, but that in the other groups there was a distinct though small negative correlation indicating that after the 18th birthday the taller a man was the more likely he was to be dolichocephalic.

All the regression polygons with their best fitting regression lines were plotted. Eight of these appear in Figs. 1—4, and in all cases it was seen that straight lines were quite as suitable as other "curves" for the representation of the regression lines.

CONCLUSIONS.

From the foregoing investigation we arrived at the following conclusions with regard to the relation between stature, head length and head breadth of male natives of the north-east of Scotland:—

- (1) That stature, on the average, varied directly with head length.
- (2) That it was independent of head breadth with the exception of individuals in the 17-year-old group.

¹ Macdonell, W. R., "On Criminal Anthropometry and the Identification of Criminals," *Biometrika*, 1901-1902, vol. i, p. 188.

- (3) That a calculation of the cephalic index helped to confirm the two foregoing conclusions, the stature tending to vary inversely to the cephalic index except in the case of the 17-year group, where there was practically no correlation.

We wish to record our thanks to Mr. James G. Taylor, M.A., Carnegie Research Student in Psychology, Aberdeen University, for the assistance which he gave in connection with this communication.

TABLE I.—*Frequency-distribution for age of 894 male medical students belonging to the north-east of Scotland.*

Age last birthday (in years)	...	16	17	18	19	20	21	22	23	24	25	26	27
Number of cases	...	47	212	208	133	98	64	33	31	17	16	8	5
Age last birthday (in years)	...	28	29	30	31	32	33	34	35	36	37	38	
Number of cases	...	8	2	1	3	2	3	0	0	0	2	1	

TABLE II.—*Correlation coefficients for (1) stature and head length, (2) stature and head breadth, (3) stature and cephalic index, and (4) head length and head breadth of 847 male medical students belonging to the north-east of Scotland.*

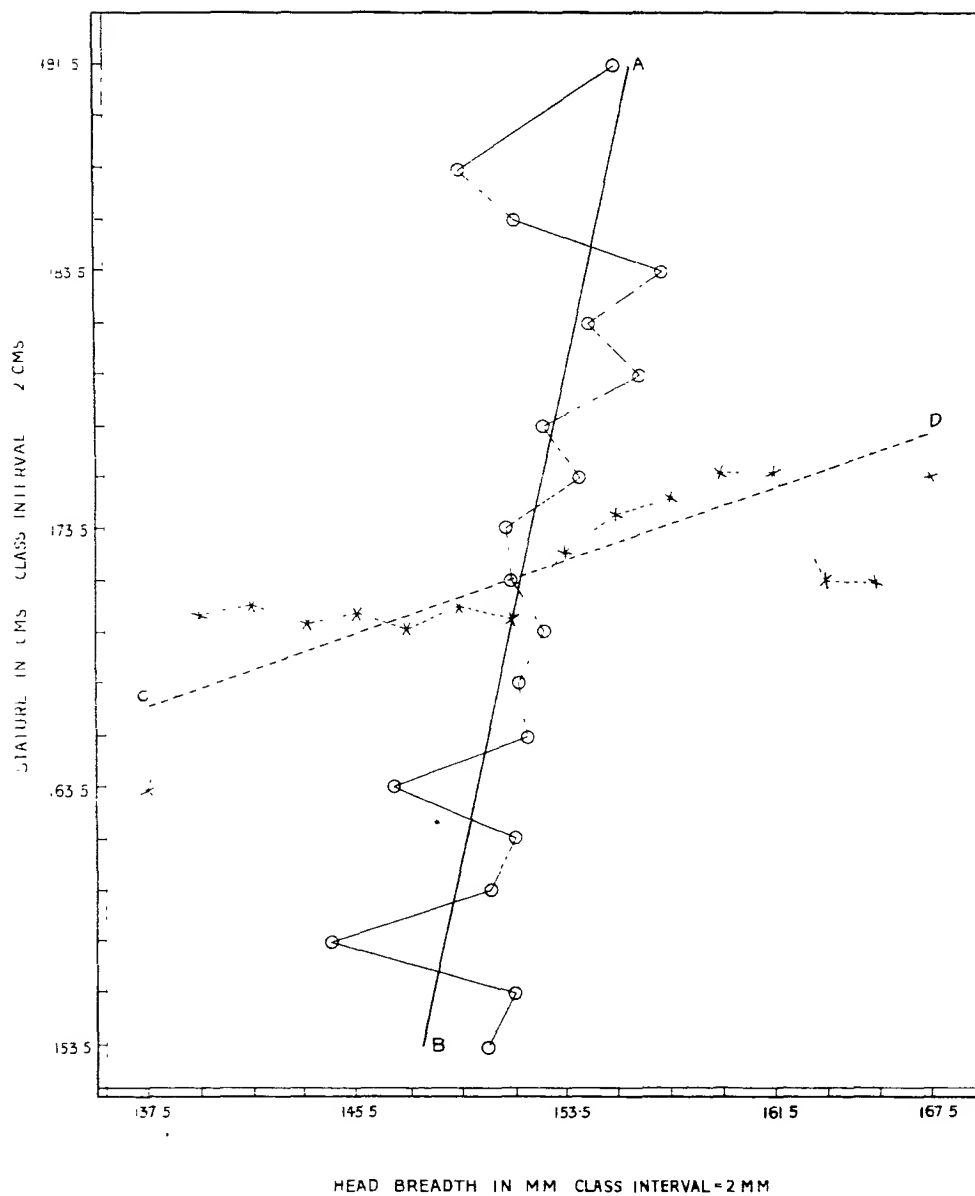
Number of Cases.	Age (in Years).	Stature and Head Length.	Stature and Head Breadth.	Stature and Cephalic Index.	Head Length and Head Breadth.
212	17	-.2865 ± .0425	-.2703 ± .0429	-.0038 ± .0463	-.3007 ± .0421
208	18	-.3468 ± .0411	-.1012 ± .0463	-.1955 ± .0450	-.2130 ± .0446
231	19 and 20	-.2041 ± .0425	-.0732 ± .0441	-.1052 ± .0439	-.2674 ± .0412
196	21 and upwards.	-.3686 ± .0416	-.0280 ± .0481	-.2565 ± .0450	-.2277 ± .0457

TABLE III.—*Partial correlation coefficients for (1) stature and head length, (2) stature and head breadth (3) head length and head breadth, of 847 male medical students belonging to the north-east of Scotland.*

Number of Cases.	Age (in Years).			Stature and Head Length with Head Breadth Constant.	Stature and Head Breadth with Head Length Constant.	Head Length and Head Breadth with Stature Constant.
212	...	17	...	—·2235	—·2015	—·2421
208	...	18	...	—·3346	—·0298	—·1907
231	...	19 and 20	...	—·1920	—·0197	—·2586
190	...	21 and upwards	...	—·3721	—·0618	—·2340

TABLE IV.—*Regression equations. Head length (L) and head breadth (B) are expressed in millimetres, stature (S) in centimetres. The standard errors made in estimating stature, head length and head breadth from the two remaining characters in each case are also given.*

Age Groups (in Years).				Regression Equations.	Standard Errors.
Stature.	17	...	...	$S = -\cdot2470 L - \cdot2601 B - 84\cdot4215$	6·0997
	18	...	...	$S = -\cdot3363 L - \cdot0327 B - 101\cdot5840$	5·3985
	19 and 20	...	...	$S = -\cdot1865 L - \cdot0288 B - 133\cdot0558$	5·1371
	21 and upwards	...	...	$S = -\cdot4151 L - \cdot0767 B - 103\cdot5248$	5·6708
Head length.	17	...	...	$L = -\cdot2828 B - \cdot2022 S - 115\cdot8897$	5·5175
	18	...	...	$L = -\cdot2079 B - \cdot3329 S - 105\cdot5290$	5·3711
	19 and 20	...	...	$L = -\cdot3077 B - \cdot1977 S - 113\cdot4264$	5·2895
	21 and upwards	...	...	$L = -\cdot2616 B - \cdot3335 S - 97\cdot4769$	5·0830
Head breadth.	17	...	...	$B = -\cdot1561 S - \cdot2072 L - 84\cdot9875$	4·7235
	18	...	...	$B = -\cdot0272 S - \cdot1749 L - 114\cdot1646$	4·9266
	19 and 20	...	...	$B = -\cdot0171 S - \cdot2174 L - 107\cdot3256$	4·4460
	21 and upwards	...	...	$B = -\cdot0498 S - \cdot2105 L - 119\cdot9912$	4·5718

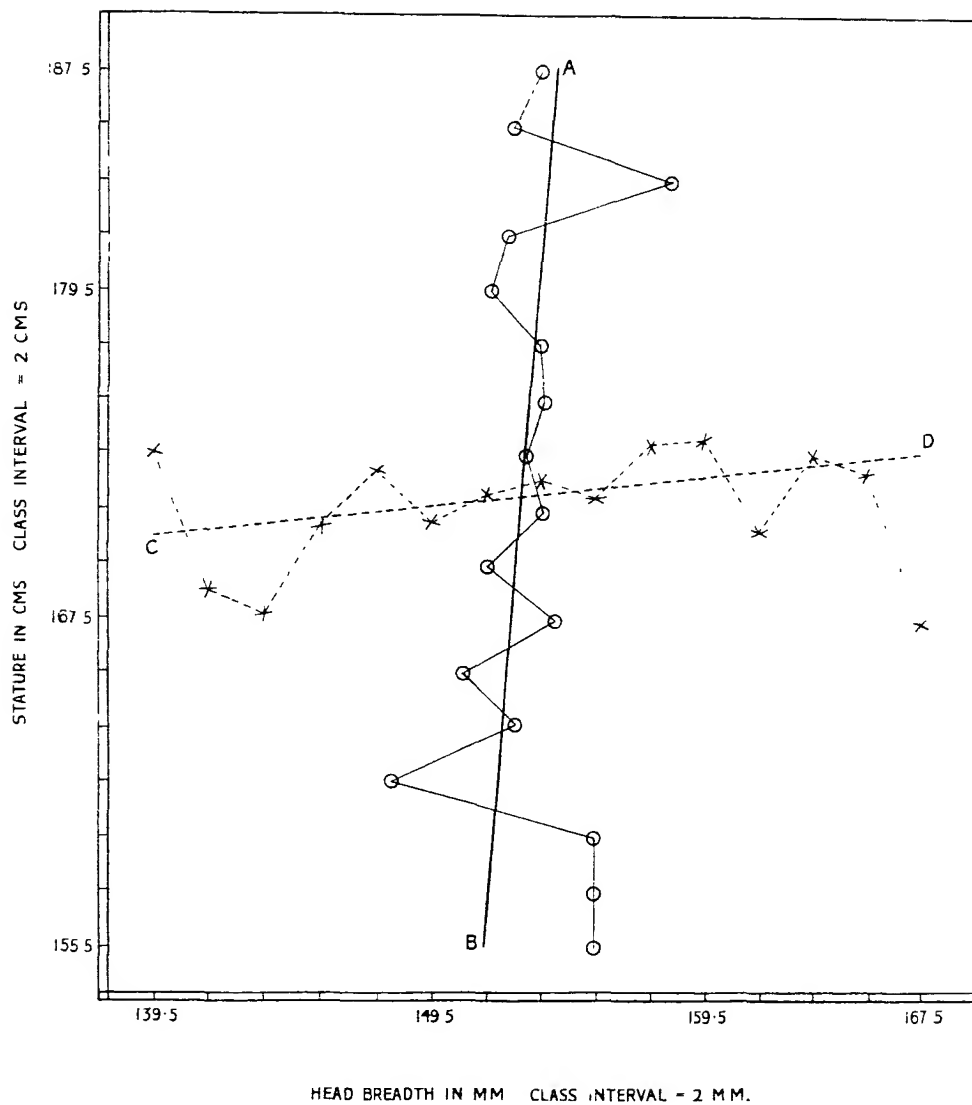


Correlation coefficient = $-.2703 \pm .0429$.

Line AB gives probable head breadth for a given stature. $B = -.2102S + 115.8048$.

Line CD gives probable stature for a given head breadth. $S = -.3475B + 118.9581$.

FIG. 1.—CORRELATION BETWEEN STATURE AND HEAD BREADTH OF 212 MALE MEDICAL STUDENTS, AGED 17 YEARS, FROM THE NORTH-EAST OF SCOTLAND.

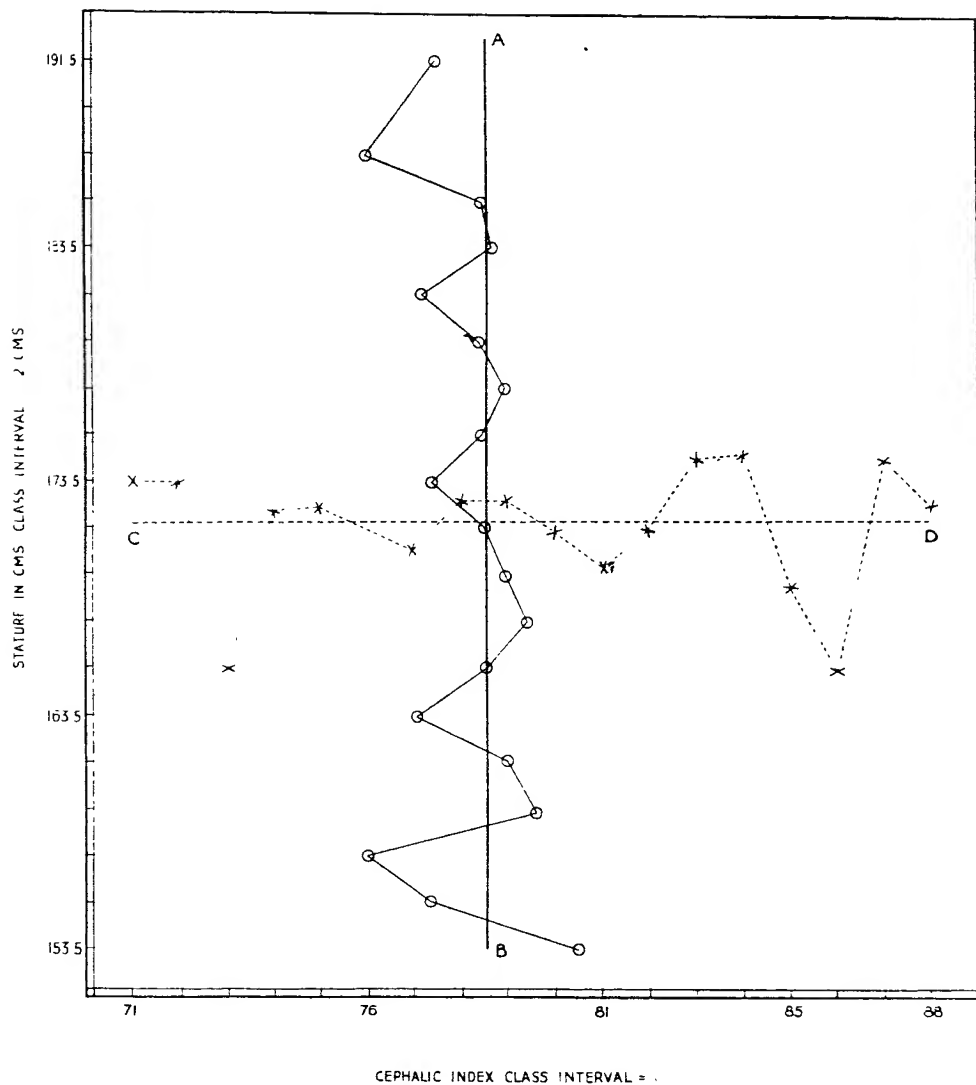


Correlation coefficient = $\pm .1012 \pm .0463$.

Line AB gives probable head breadth for a given stature. $B = \pm .0886S \pm 137.5341$.

Line CD gives probable stature for a given head breadth. $S = - .1153B \mp 154.3591$.

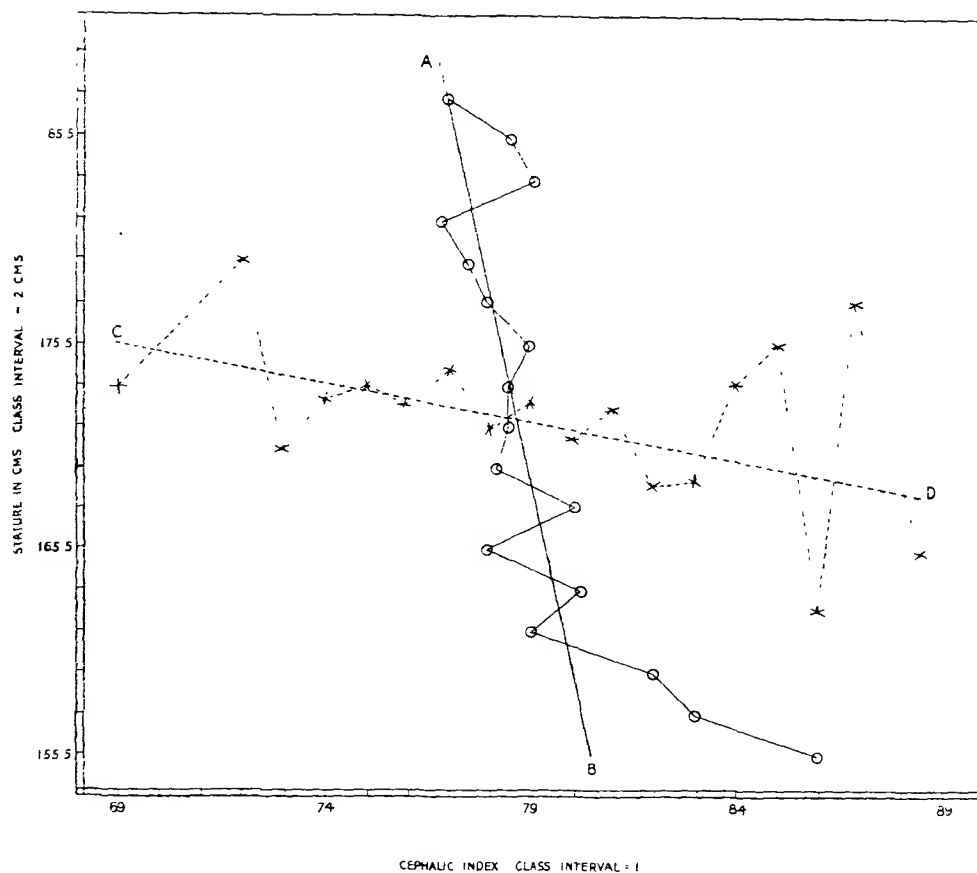
FIG. 2.—CORRELATION BETWEEN HEAD BREADTH AND STATURE FOR 208 MALE MEDICAL STUDENTS, AGED 18 YEARS, FROM THE NORTH-EAST OF SCOTLAND.



Line AB gives probable cephalic index for a given stature. $I = \div 0.00188 - 78.3088$.

Line CD gives probable stature for a given cephalic index. $S = -0.00821 \div 171.1006$.

FIG. 3.—CORRELATION BETWEEN STATURE AND CEPHALIC INDEX FOR 212 MALE MEDICAL STUDENTS AGED 17 YEARS. FROM THE NORTH-EAST OF SCOTLAND.



Correlation coefficient = $-.1955 \pm .0450$.

Line AB gives probable cephalic index for a given stature. $I = -.1072S - 97.1165$.

Line CD gives probable stature for a given cephalic index. $S = -.3567I - 200.0836$.

FIG. 4.—CORRELATION BETWEEN STATURE AND CEPHALIC INDEX FOR 208 MALE MEDICAL STUDENTS AGED 18 YEARS, FROM THE NORTH-EAST OF SCOTLAND.

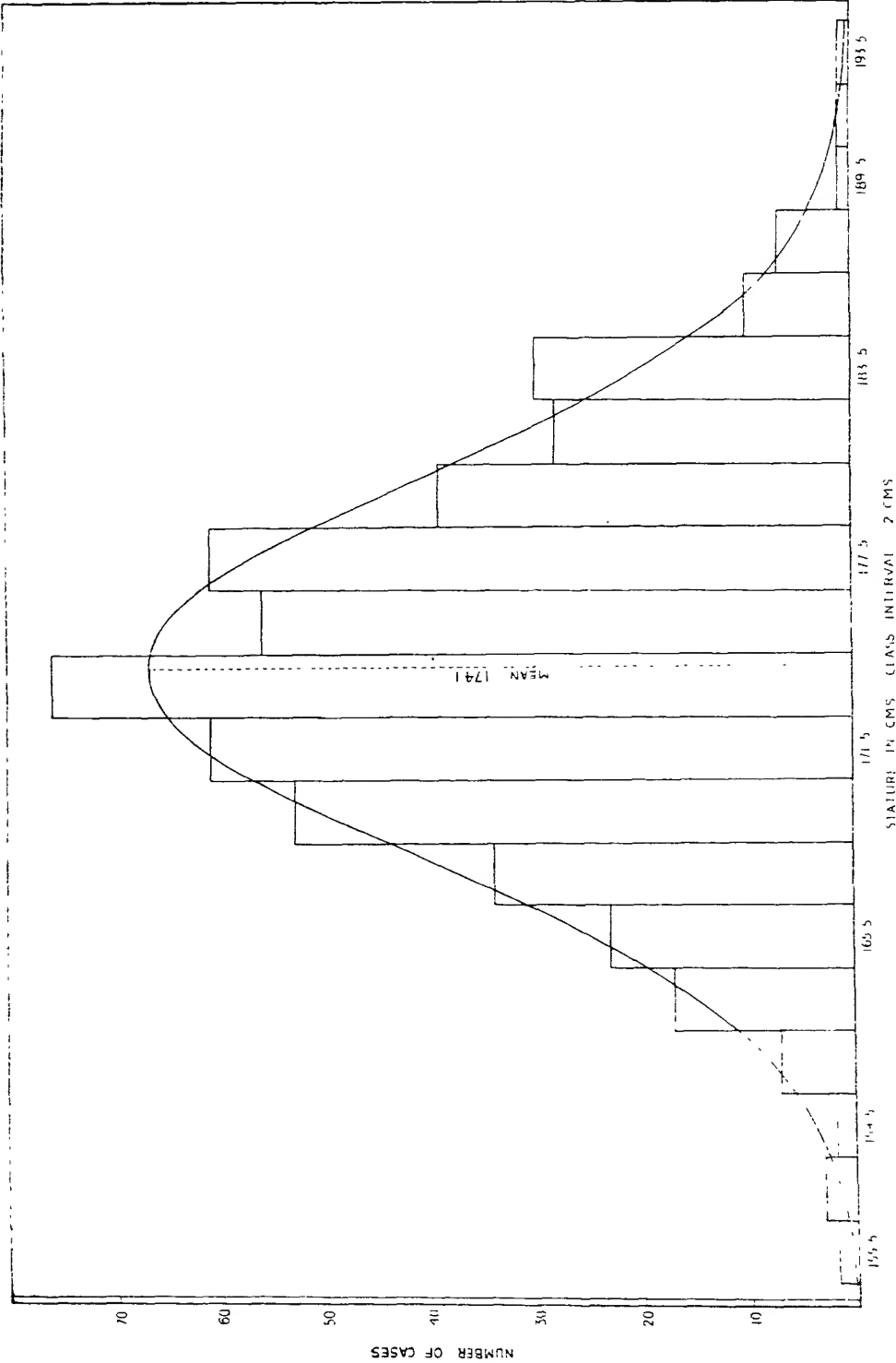


FIG. 5. - GAUSSIAN CURVE FITTED TO FREQUENCY-DISTRIBUTION OF STATURE OF 512 MALE MEDICAL STUDENTS BELONGING TO THE NORTH-EAST OF SCOTLAND.

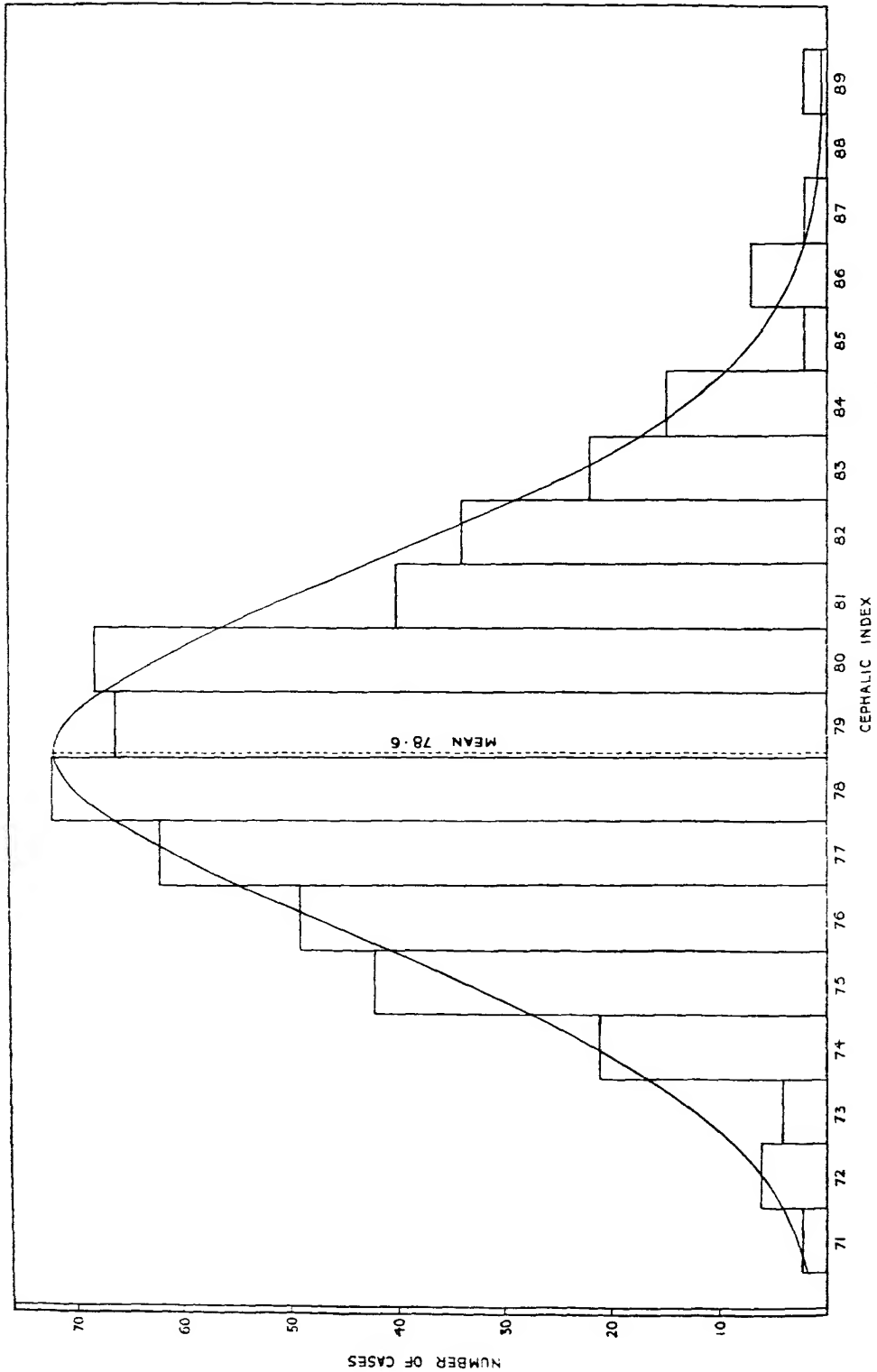


FIG. 6. GAUSSIAN CURVE FITTED TO FREQUENCY DISTRIBUTION OF CEPHALIC INDEX OF 512 MALE MEDICAL STUDENTS BELONGING TO THE NORTH-EAST OF SCOTLAND.

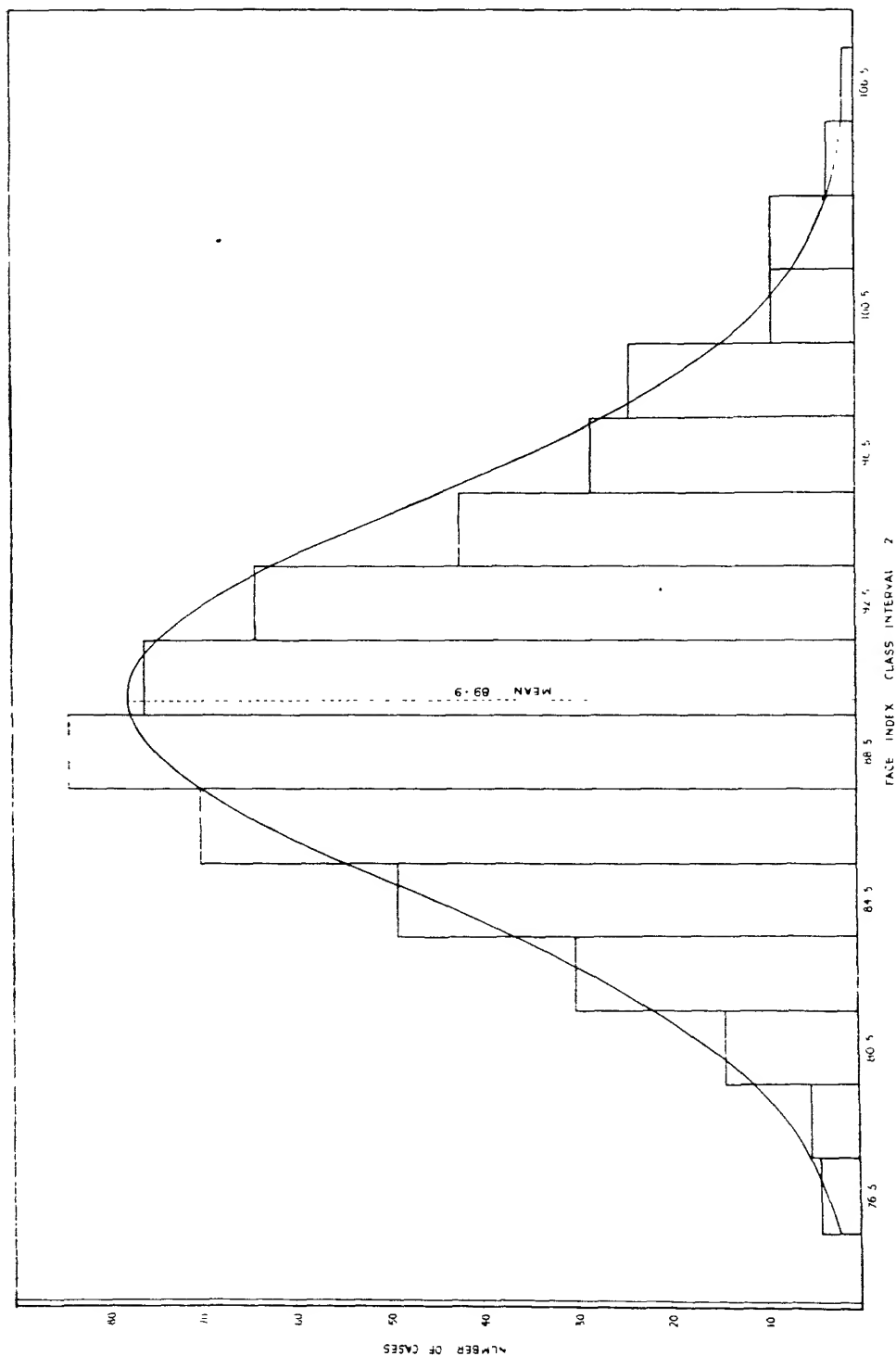


FIG. 7. GAUSSIAN CURVE FITTED TO FREQUENCY-DISTRIBUTION OF FACE INDEX OF 512 MALE MEDICAL STUDENTS BELONGING TO THE NORTH-EAST OF SCOTLAND.

II.—AN ANTHROPOMETRIC COMPARISON BETWEEN NATIVES OF THE NORTH-EAST OF SCOTLAND AND INHABITANTS OF NORWAY AND SWEDEN.

The research embodied in this communication was undertaken in order to compare anthropometrically the inhabitants of the north-east of Scotland and those of Scandinavia with reference to racial affinity.

Anthropometric observations were obtained from the records made under the supervision of Professor R. W. Reid, in the Anthropometric Laboratory of the University of Aberdeen, from observations recorded in *Anthropologia Svecica* by Retzius and Fürst, Stockholm, 1902, and in *Møre Fylkes Antropologi* by Bryn, Christiania, 1920.

Of the physical characters of the human body only those were selected for the purpose of the research which were common to the three sources just mentioned, and which were usually adopted in distinguishing the Nordic, Alpine, and Mediterranean types of white man in Europe.

Of these characters four were "variables," viz., stature, cephalic index, face index, nose index, and three were "attributes," viz., hair colour, eye colour and profile of nose. Certain combinations of these characters were also employed.

Before proceeding to the actual comparison of the several characters it was thought desirable to consider the nature of the material to be investigated especially with regard to its homogeneity.

The north-east of Scotland observations were made from 512 male medical students whose ages varied from 20 to 25 years, and whose parents had been born within an area of the north-east of Scotland comprising the counties of Nairn, Elgin, Banff, Aberdeen, Kincardine, Forfar and Fife. The number of 512 was made up of 259 students whose ages ranged from 20 to 25 years when first observed and of an additional 253 who had reached that period of life on the occasion of a second observation.

In order to test the homogeneity of the material, a sample of 200 individuals was taken from it at random, and the averages and standard deviations of stature, cephalic index, face index and nose index of the sample were compared with the averages and standard deviations of the corresponding characters of the material taken as a whole (Table V).

On reference to Table VI it was seen that in no case did a difference exceed twice its probable error, hence the averages and standard deviations of the sample and of the material as a whole were considered to be practically the same. The material was therefore reckoned to be homogeneous in so far as this test revealed.

This view was further corroborated by the fact that the coefficient of variation for stature ($3.51 \pm .04$, Table IX) was less than that ($3.99 \pm .06$) found by Professor Karl Pearson and Miss Alice Lee¹ for Englishmen.

¹ Pearson, Karl, and Lee, Alice, "On the Laws of Inheritance in Man," *Biometrika*, vol. ii, p. 370, 1902-3.

Again, Table VII and Figs. 5, 6, 7 showed that the normal curve fitted the frequency-distribution for stature, cephalic index and face index quite satisfactorily.

From these considerations it was concluded that the north-east of Scotland material was homogeneous.

The Norwegian observations were made from about 1,300 army recruits, whose ages varied from 21 to 22 years and who inhabited the Romsdal district of Norway.

As no separate record for each individual was published by Bryn, it was impossible to apply the sampling test which had been used in the case of the north-east of Scotland material.

Bryn, however, gave the averages for stature in each of the four cantonal law circuits into which the Romsdal district was divided as varying from 168.0 cms. to 172.3 cms., for cephalic index as varying from 77.7 to 80.8, and face index as varying from 87.2 to 91.9.

It was apparent, therefore, that the observations which Bryn had made tended to show that the inhabitants of the Romsdal district did not form a homogeneous mass.

Unfortunately he did not mention the coefficients of variation for the several characters, but it was found by calculating from his tabulated figures that the coefficient of variation for stature was smaller than that found by Pearson and Lee as regards Englishmen.

With regard to the normal curve, it was found that it fitted excellently to the frequency distribution of stature, somewhat imperfectly to that of face index, and very indifferently to that of cephalic index (Table VII).

On the whole, therefore, by comparing the observations made upon the two groups of individuals, the conclusion arrived at was that the students who were natives of the north-east of Scotland formed a more homogeneous mass than the inhabitants of the Romsdal district.

The Swedish observations were derived from an investigation of 15,688 soldiers, each of whom was 21 years of age.

Having dealt with Retzius' figures in the manner just described for Scotland and Norway, we came to the conclusion that the population of Sweden was not a homogeneous one, for there was a great disparity in the averages for stature and cephalic index in the various provinces, and the normal curve fitted the distributions of these characters very badly (Table VII).

Having thus examined the material at our disposal as regards its homogeneity, the three groups were compared with reference to the individual characters already mentioned, viz., the four "variables," stature, cephalic index, face index, nose index, and the three "attributes," hair colour, eye colour, and profile of nose.

This was effected by comparing them with respect to their averages and coefficients of variation in the case of the variables and by the use of Professor Pearson's chi-square test in the case of both variables and attributes.

Stature.

Table VIII showed that the average stature for the north-east of Scotland was 174.08 cms., for Norway 171.98 cms., and for Sweden 171.37 cms. The stature consequently for each group fell into the category known as "tall" (170 cms. and over), and it was notable that the average stature of the individuals belonging to the north-east of Scotland was distinctly greater than that of the other two countries even when the probable errors were taken into account.

Although the average stature for the north-east of Scotland group was thus found to be different from that of either Norway or Sweden, yet the degree of variability for stature as measured by the coefficient of variation was practically identical for the three countries (Table IX).

When Professor Pearson's chi-square test¹ was applied with a view of finding whether in so far as stature was concerned the students of the north-east of Scotland belonged to the same stock as the individuals inhabiting Sweden and the Romsdal district of Norway, it was found that there was a very slight degree of probability (P) that they did so, as, in the case of Norway, P was $10^{-5} \times 7.46$, and, in the case of Sweden, $10^{-22} \times 1.47$ (Tables X and XI).

This slight degree of similarity was thought to be due to the want of homogeneity in the Norwegian and Swedish populations and to the extra height of the individuals composing the Scottish group.

When a comparison as regards stature was made between the natives of the north-east of Scotland and those of Sweden, who were alike in some other character (Table XI) it was found that if shape of head or pigmentation was taken into account a greater similarity as regards stature was found to exist.

Cephalic Index.

As the average cephalic index for the north-east of Scotland was $78.63 \pm .09$, for Sweden $78.62 \pm .01$, and for Norway $79.22 \pm .06$, the cephalic index for each of the three groups was mesocephalic, the indices for the north-east of Scotland and Sweden being practically identical, Norway differing very slightly from the others in its greater tendency towards brachycephaly.

Sweden and the north-east of Scotland showed almost the same degree of variability as regards cephalic index, as was seen from the coefficients of variation (Table IX). The Norwegians, on the other hand, presented a slightly higher degree of variability.

The striking similarity with regard to cephalic index between the Scottish and Swedish individuals was further confirmed by the application of Professor Karl Pearson's chi-square test, which pointed to the fact that the probability was extremely great that the two groups of persons represented samples taken at

¹ Pearson, Karl. "On the Probability that Two Independent Distributions of Frequency are really Samples from the Same Population," *Biometrika*, vol. viii, pp. 250-54, 1911.

random from the same stock (Table XI). It was noticeable that individuals who were alike as regards stature or hair colour were not so alike with respect to cephalic index.

The chi-square test showed also that in the case of cephalic index there was less similarity between the natives of the north-east of Scotland and those of Norway than there was between the natives of the north-east of Scotland and those of Sweden (Tables X and XI). The test also made it appear that there was a greater probability that the Scottish students and the Norwegian group belonged to the same stock if cephalic index rather than stature was used in the comparison (Table X).

Face Index.

It was impossible to contrast the students of the north-east of Scotland and the inhabitants of Sweden as regards shape of face because no statistics were available for the latter country. We were, therefore, obliged to confine our attention to a comparison between the north-east of Scotland and Norway.

For both these countries we found that the faces were on the average long, with a face index of $89.86 \pm .16$ for the north-east of Scotland and $88.51 \pm .19$ for Norway. This difference, $1.35 \pm .25$, was not solely due to sampling since it was greater than three times the probable error.

The variability of face index in each of the two countries was the same (Table IX).

The chi-square test indicated that there was a small degree of probability that the two distributions for face index were derived from the same source (Table X).

Nose Index.

Frequency-distributions were not given for nose index by either Bryn or Retzius. Bryn, however, gave an average of 67.8 for the Romsdal district. This was greater than the average for the north-east of Scotland by about 6.6. Since both the average nose indices were below 69.9 they fell into the category known as leptorrhine.

Hair Colour.

It was difficult to make a satisfactory comparison as regards colour of hair between the inhabitants of the three countries under investigation, as the classification of colours used in Sweden was different from that used in the other two. A comparison was made possible, however, by adapting the Swedish classification to that employed in Norway and in the north-east of Scotland, viz., black, dark brown, light brown, fair and red.

On comparing hair colour in the north-east of Scotland with that in Norway it was found that on the whole the hair was fairer in the north-east of Scotland than it was in Norway, and the chi-square test pointed out that there was a very slight degree of probability that the colour of the hair in the two countries belonged to individuals derived from a common stock (Table XI).

The hair of the inhabitants of Sweden, on the other hand, was even fairer than that of the students of the north-east of Scotland, and an application of the chi-square test showed that the two groups of people were extremely divergent in this respect. Individuals taken from the two groups who were alike as regards stature or cephalic index were somewhat more alike as regards hair colour (Table XI).

Eye Colour.

In dealing with the statistics derived from the north-east of Scotland, Norway and Sweden, colours of eyes in each case were divided into three classes.

In the case of the Scottish students the eyes were classified as dark, medium and light, by direct comparison with a set of three artificial eyes used as types.

In Norway and Sweden the colour scales distinguished three classes—brown, mixed and a third of blue and grey, and we considered these to correspond to the dark, medium and light types used in the Scottish classification. It is unnecessary to say that this attempt to harmonize the classifications was, to say the least of it, unsatisfactory, partly on account of the personal equation, and partly on account of the dissimilarity of the scales used in the three countries to distinguish the colours of the eyes.

Having made this attempt to reconcile the different colour scales, it was seen that medium-coloured eyes preponderated in the north-east of Scotland and light eyes in Norway and Sweden (Table XIII).

Profile of Nose.

The types used for comparison were those recommended by Topinard which may be roughly classified as rectilinear, sinuous, concave and convex. A comparison was only possible in the case of Norway, as no observations were given by Retzius as to this attribute.

As may be seen from Table XIV, the rectilinear and sinuous shapes were greatly in excess of the other forms in both the north-east of Scotland and Norway. They were particularly so in the north-east of Scotland, which was correspondingly poorer in the concave and convex forms.

Combination of Characters.

In order to determine as far as possible the percentages of the Nordic, Mediterranean, and Alpine types (according to Boule) in the three groups of individuals, we employed certain combinations of the characters with which we have just dealt.

Table XVI was drawn up to show the distribution of the north-east of Scotland students according to stature, cephalic index, face index and nose index. The measurements of each of these characters were arbitrarily divided into two or three classes in the manner most usually adopted. Unfortunately, however, these classes did not quite correspond in their limits with those adopted by either Bryn or Retzius. Consequently it was necessary to calculate percentages for the north-east of Scotland in accordance with the classes as defined by Bryn and Retzius.

Nordic.—This type is characterized by tallness of stature, dolichocephaly, narrowness of nose and face, fair hair and light eyes.

Bryn gave for Norway the percentage of persons who were tall (stature 171.0 cm. and over), long-headed (head index 75.9 and under), narrow-faced (face index 88 and over), and narrow-nosed (nose index 69.9 and under) as 6.16. The corresponding percentage for the north-east of Scotland was 11.13, which was a percentage in excess of that for Norway by 4.97. It was not possible to calculate the probable error of this excess, because no mention was made by Bryn of the number of cases from which he calculated this percentage.

Bryn did not consider in connection with Norway colour of hair and colour of eyes in association with other characters.

In Sweden the percentage of tall (170 cms. and over), long-headed (cephalic index 76.9 and under), fair-haired and light-eyed individuals was 10.07. In the north-east of Scotland, however, it was only 1.76 or a difference of 8.31 ± 0.90 per cent. The percentage of tall and long-headed persons in Sweden was 18.83 and in the north-east of Scotland it was 25.39. There was thus a distinctly larger percentage of the tall and long-headed persons in the north-east of Scotland, the difference between the two countries being 6.56 ± 1.17 per cent. Retzius made no mention of shape of face or shape of nose in combination with other characters.

It was concluded that the Nordic type occurred in a larger percentage of cases in the north-east of Scotland than in either Norway or Sweden when colour of hair and eyes was excluded from consideration. On the other hand, when these characters, an estimation of which we have already pointed out as being unsatisfactory, were taken into account, the percentage of the Nordic type in the north-east of Scotland was relatively small.

Mediterranean.—This type is characterized by smallness of stature, dolichocephaly, narrowness of face, somewhat broad nose, dark hair and dark eyes.

Bryn gave for Norway the percentage of small-statured (167.9 cms. and under), cephalic index (75.9 and under), narrow-faced (face index over 88), not narrow-nosed (nose index 70 and upwards) individuals as 0.32. The corresponding percentage for the north-east of Scotland was 0.20, the difference being 0.12.

Among the Swedish people the percentage of small (159.9 cms. and under), long-headed (cephalic index 76.9 and under), dark-haired and dark-eyed individuals was 0.01. In the north-east of Scotland, however, it was 0.20, also a very small percentage, differing from the Swedish value by 0.19 ± 0.04 .

Hence it was considered that in all the three countries investigated the percentage of the Mediterranean type was practically negligible.

Alpine.—This type is characterized by smallness of stature, brachycephaly, broadness of face and nose, dark hair and dark eyes.

Bryn gave for Norway the percentage of small-statured (167.9 cms. and under), broad-headed (cephalic index 81.0 and upwards), broad-faced (face index 83.9 and

under), not narrow-nosed (nose index 70 and upwards) individuals as 0.32. The corresponding percentage for the north-east of Scotland was 0.20, differing from that of Norway by 0.12.

Among the Swedish people the percentage of small (159.9 cms. and under), broad-headed (cephalic index 82.0 and over), dark-haired and dark-eyed individuals was 0.002. In the north-east of Scotland there were no cases of the Alpine type as thus defined.

Hence it was seen that in all the three countries investigated the percentage of the Alpine type was practically negligible.

CONCLUSIONS.

An anthropometric comparison between the students who were natives of the north-east of Scotland observed in the Anthropometric Laboratory of the University of Aberdeen and the inhabitants of Norway and Sweden as observed and described by Bryn and Retzius was rendered somewhat unsatisfying, partly on account of the lack of homogeneity among the Scandinavians, partly from want of observations of certain characters in connection with the Scandinavians, and partly on account of the absence of anthropometric scales common to the three countries.

Broadly speaking, the students from the north-east of Scotland were like the Scandinavians in that they were on the average tall and mesocephalic. They were particularly like the Swedes as regards shape of head.

They were like the Norwegians in having on the average narrow faces and narrow noses with profiles of the latter mainly straight or sinuous. They could not be compared with the Swedes as regards shape of face or nose from deficiency of Swedish observations.

The colour of their hair was intermediate between the darker of the Norwegian and the fairer of the Swede.

The colour of their eyes differed from both, in that it was darker.

They showed a larger percentage of the Nordic type than either the Norwegian or Swedish peoples when the question of pigmentation was disregarded. When this attribute—which could be considered only in an unsatisfactory way in connection with the Swedish people, and, from want of observations, not at all in connection with the Norwegians—was taken into consideration the students from the north-east of Scotland showed a smaller percentage of the Nordic type than the inhabitants of Sweden.

All three groups of individuals under investigation showed a practically negligible percentage of the Alpine and Mediterranean types.

The writers wish to acknowledge the invaluable and unstinted help which has been given to them in the preparation of *Communications I and II* by Mr. James Goodwillie, M.A., B.Sc., Assistant to the Professor of Mathematics in the University of Aberdeen.

They are indebted to the Carnegie Trust for the Universities of Scotland for a Grant in aid of the publication of these two communications.

TABLE V.—Means and standard deviations of stature, cephalic index, face index and nose index for the complete north-east of Scotland group, and for a sample taken from it at random.

Character.	Mean.		Standard Deviation.	
	Entire Group.	Sample.	Entire Group.	Sample.
Stature (in centimetres)	174·0820 ±·1823	174·2300 ±·3073	6·1154 ±·1289	6·4446 ±·2173
Cephalic index	78·6289 ±·0875	78·7500 ±·1315	2·9358 ±·0619	2·7576 ±·0930
Face index	89·8633 ±·1569	90·1000 ±·2605	5·2622 ±·1109	5·4614 ±·1842
Nose index	61·1758 ±·1862	61·1200 ±·3061	6·2474 ±·1317	6·4190 ±·2164

TABLE VI.—The differences between the means and standard deviations of the complete north-east of Scotland group and the sample taken from it at random with the probable errors of the differences.

Character.	Differences of Means between Entire Group and Sample.	Differences of Standard Deviations between Entire Group and Sample.
Stature (in centimetres)	·1480 ±·3574	·3292 ±·2526
Cephalic index	·1211 ±·1578	·1782 ±·1114
Face index	·2367 ±·3041	·1992 ±·2149
Nose index	·0558 ±·3583	·1716 ±·2532

TABLE VII.—*The "goodness of fit" of the normal curve for the frequency-distributions of stature, cephalic index and face index. The distribution for face index in Sweden as a whole is not given by Retzius.*

Character.	North- East of Scotland.	Norway.	Sweden.
	$n' = 14$	$n' = 20$	$n' = 21$
Stature	$P = .70$	$P = .85$	$P = 10^{-74}$ 8.79
	$n' = 13$	$n' = 21$	$n' = 22$
Cephalic index	$P = .61$	$P = .07$	$P = 10^{-162}$ 3.04
	$n' = 16$	$n' = 24$	—
Face index	$P = .55$	$P = .34$	

TABLE VIII. Comparison between north-east of Scotland group and (1) Norwegian group and (2) Swedish group as regards the means of stature and cephalic index, and between north-east of Scotland and Norwegian group as regards face index and nose index.

Character.	North-East of Scotland.	Norway.		Sweden.	
		Mean.	Difference of Mean from that for the North-East of Scotland.	Mean.	Difference of Mean from that for the North-East of Scotland.
Stature (in centimetres)...	174.0820 ± .1823	171.9821 ± .1111	2.0999 ± .2135	171.3706 ± .0186	2.7114 ± .1833
Cephalic index ...	78.6289 ± .0875	79.2155 ± .0642	.5866 ± .1086	78.6224 ± .0098	.0065 ± .0883
Face index ...	89.8633 ± .1569	88.5129 ± .1923	1.3504 ± .2182		
Nose index ...	61.2 ± .2	67.8 Probable error not calculable	6.6		

TABLE IX.—Comparison as regards degree of variability between the north-east of Scotland group and (1) the Norwegian group for stature, cephalic index, and face index and (2) the Swedish group for stature and cephalic index.

Character.	North-East of Scotland.	Norway.		Sweden.	
		Coefficient of Variation.	Difference of Co-efficient from that for North-East of Scotland.	Coefficient of Variation.	Difference of Co-efficient from that for North-East of Scotland.
Stature	3.5129 ± .0741	3.5074 ± .0446	.0055 ± .0865	3.4029 ± .0077	.1100 ± .0748
Cephalic index	3.7337 ± .0788	4.1386 ± .0574	.4049 ± .0975	4.0154 ± .0088	.2817 ± .0793
Face index	5.8558 ± .1239	5.6632 ± .1541	.1926 ± .1977	—	—

TABLE X.—Comparison between the north-east of Scotland group and the Norwegian group by the chi-square test for stature, cephalic index, face index, and hair colour.

Character	χ^2	P	n'
Stature	43.98	10^{-11} 7.46	7
Cephalic index	14.46	.01	5
Face index	13.53	.02	6
Hair colour	43.12	10^{-11} 9.77	5

TABLE XI.—Comparison between the north-east of Scotland group and the Swedish group as regards stature, skull index and colour of hair (1) for the two groups taken as a whole and (2) for sections of the two groups which are alike as regards stature, skull index or hair colour.

		Comparison as regards Stature.	Comparison as regards Cephalic Index.	Comparison as regards Colour of Hair.
Stature.	Groups as a whole	10^{-11} 1.47	.98	10^{-11} 3.32
	Groups of tall people	—	.93	10^{-10} 3.21
	Groups of short people	—	.46	10^{-10} 1.72
Cephalic index.	Groups of long-headed people	10^{-12} 6.56	—	10^{-11} 1.12
	Groups of broad-headed people	10^{-12} 2.31	—	10^{-10} 1.56
Hair colour.	Groups of fair-haired people	10^{-10} 2.10	.54	—
	Groups of dark-haired people	10^{-10} 2.17	.65	—
n'		7	6	4

TABLE XII.—*Comparison as regards colour of hair between the north-east of Scotland, Norway and Sweden. The differences for the percentages of each colour between the north-east of Scotland and Norway and Sweden respectively are given with their corresponding probable errors.*

	Black.	Dark Brown.	Light Brown.	Fair.	Red.	Total Number of Cases.
North-east of Scotland ...	1.17	23.63	45.70	25.39	4.10	512
Norway	4.71	35.71	36.73	19.31	3.53	1,274
Difference between Norway and north-east of Scotland	3.54 ± 0.66	12.08 ± 1.65	8.97 ± 1.73	6.08 ± 1.44	0.57 ± 0.66	—
Sweden	0.81	21.48		75.39	2.32	44,900
Difference between Sweden and north-east of Scotland	0.36 ± 0.27	47.85 ± 1.24		50.00 ± 1.30	1.78 ± 0.45	—

TABLE XIII.—*Comparison as regards eye-colour between the north-east of Scotland, Norway and Sweden. The differences between the north-east of Scotland and Norway and Sweden respectively are given with their corresponding probable errors.*

	Dark.	Medium.	Light.	Total Number of Cases.
North-east of Scotland	23.29	50.78	26.03	512
Norway	11.80	21.00	67.20	1,274
Difference between north-east of Scotland and Norway	11.49 ± 1.26	29.78 ± 1.61	41.17 ± 1.75	—
Sweden	4.39	28.88	66.73	44,900
Difference between north-east of Scotland and Sweden	18.90 ± 0.63	21.90 ± 1.36	40.70 ± 1.42	—

TABLE XIV.—Comparison as regards profile of nose between the north-east of Scotland and Norway. The difference between the percentages for each nose type is given with its probable error.

					Rectilinear and Sinuous.	Concave.	Convex.	Total Number of Cases.
North-east of Scotland					96.09	3.13	0.78	512
Norway ...					88.93	23.30	7.77	309
Difference between north-east of Scot- land and Norway					27.16 1.69	20.17 1.50	6.99 0.88	—

TABLE XV. *The frequency-distributions of stature, cephalic index, and face index for 512 male medical students, natives of the north-east of Scotland. The classes are represented by the mid-values of the class intervals.*

Stature (in centimetres.)	(Class ...	...	...	155.5	157.5	159.5	161.5	163.5	165.5	167.5	169.5	171.5	173.5	175.5	177.5	179.5	181.5	183.5	185.5	187.5	189.5	191.5	193.5


	Frequency ...	...	...	2	3	2	7	17	23	34	53	61	76	56	61	39	28	30	10	7	1	1	1
Cephalic Index.	(Class ...	...	...	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90


	Frequency ...	...	...	2	6	4	21	42	49	62	72	64	66	40	34	22	15	2	7	2	0	2	--
Face Index.	(Class ...	...	...	72.5	74.5	76.5	78.5	80.5	82.5	84.5	86.5	88.5	90.5	92.5	94.5	96.5	98.5	100.5	102.5	104.5	106.5	108.5	110.5


	Frequency ...	...	...	...	...	4	5	14	30	49	70	84	76	64	42	28	24	9	9	3	1	--	--

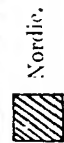
TABLE XVI. Classification of 512 male medical students belonging to the north-east of Scotland according to stature, cephalic index, face index, and nose index.

Stature Tall ... Medium ... Short ...	Cephalic index						Face index—						Nose index—								
	170 cms. and over. 160–169.9 cms. 159.9 cms. and under.			Long ... Medium ... Broad ...			75.9 and under. 76–80.9 81 and over.			Narrow ... Medium ... Broad ...			88.0 and over. 84–87.9. 83.9 and under.			Narrow ... Not narrow ...			69.9 and under. 70 and over.		
	Stature - Tall.						Stature - Medium.						Stature - Short.								
Face.	Head Long.		Head Medium.	Head Broad.		Head Long.		Head Medium.	Head Broad.		Head Long.		Head Medium.	Head Broad.		Stature Short.					
	Narrow Nose.	Not Narrow.		Narrow Nose.	Not Narrow.	Narrow Nose.	Not Narrow.		Narrow Nose.	Not Narrow.	Narrow Nose.	Not Narrow.		Narrow Nose.	Not Narrow.						
Narrow ...	58	4	141	11	34	2	12	1	37	5	11	0	0	0	0	1	0	1	0	318	
Medium ...	14	2	45	6	27	1	1	0	22	2	8	0	0	1	1	0	1	1	0	131	
Broad ...	2	1	20	10	10	1	1	0	8	2	5	1	0	0	0	2	0	0	0	63	
	74	7	206	27	71	1	14	1	67	9	24	1	0	1	2	2	2	2	0		
	81	—	233	—	75	—	15	—	76	—	25	—	1	—	4	—	2	—	—		
	—	—	389	—	—	—	—	—	116	—	—	—	—	—	7	—	—	—	—		

 Nordic.

 Mediterranean.

 Alpine.



Nordic.



Mediterranean.



Alpine.

SOUTH INDIAN BLOW-GUNS, BOOMERANGS, AND CROSSBOWS.

By JAMES HORNELL, F.L.S., F.R.A.I., late Director of Fisheries, Madras.

[WITH PLATE XXXV.]

I.—SOUTH INDIAN BLOW-GUNS.

So far as I can ascertain, no comprehensive description of the varieties of blow-gun met with in South India has previously been published. The literature of the subject is scanty and fragmentary and is restricted to (a) a note published by Dr. N. Annandale in 1906 with a plate of illustrations (1. pp. i to iii), and (b) two references in Mr. E. A. Thurston's *Castes and Tribes of South India*. The former deals solely with the introduced Bornean type of blow-gun used by the Labbai Muhammadans of the eastern coastline of South India. Mr. Thurston reproduces this account without augmentation (6. III. pp. 200–202): he also gives a short description of the blow-guns and harpoon darts used in Malabar for shooting fish (6. IV. pp. 128–129).¹ Under the head of Muduvars, a tribe of hill cultivators in Coimbatore, Malabar and Travancore, he incidentally mentions that “They kill, with a blow-pipe and dart, many small birds” (6. V. p. 98). The latter reference is apparently to the primitive form of this weapon, in which the dart is a thin splint of bamboo (Fig. 1. 4). In view of the great ethnological interest attaching to the subject, and the rapidity with which weapons of this primitive character are falling into disuse or being supplanted by more effective forms adopted from the West, I have collected all the information now available into the present note. I may add that I became originally interested in the subject because I found that the blow-gun marksman on the banks of some South Indian streams held there an analogous position to the disciple of Izaak Walton in Europe.

Three distinct descriptions of blow-gun are employed in South India. They comprise :—

- (1) A plain reed tube and simple dart used by the wild jungle tribes found in the forests of the Anamalai Hills in Coimbatore district, and in those of the adjacent Travancore mountains. The dart consists of either a thin bamboo splint or of a short length of midrib from a leaf of the Indian sago-palm (*Caryota urens*), sharpened at one end and with

¹ His further statement in this note that these are used for killing birds and small game is erroneous. They are employed exclusively in shooting fresh-water fish.

a wad of cotton cloth or of silk cotton on the butt (Fig. 1. 4). With these darts the Kādars and other jungle folk of the neighbouring hill-forests are accustomed to bring down squirrels and small birds. Sometimes, instead of darts, clay pellets are used.

- (2) More elaborate weapons where the dart is of harpoon form, with a steel single-barbed head fitted loosely at one end of a short shaft, to which it is connected by a long and thin cord, wound closely around the shaft before expulsion from the gun (Fig. 1. 1 and 2). On the butt end is

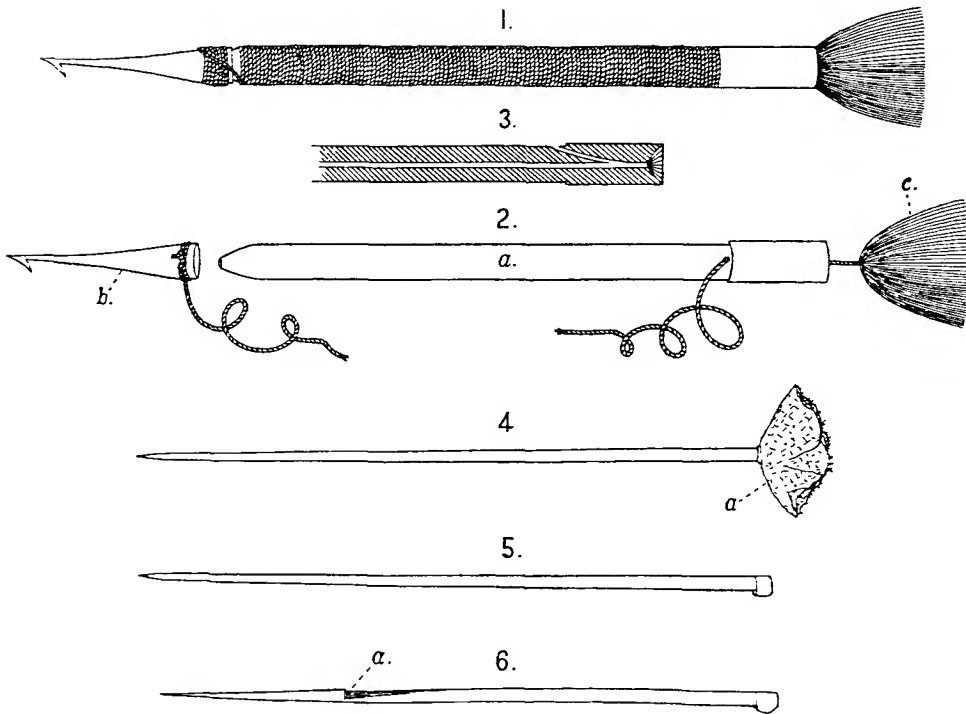


FIG. 1.

1. A MALAYALI HARPOON DART READY FOR USE. 2. DETAILS OF THE SAME:—*a*, THE SHAFT OF LEMON GRASS STEM; *b*, THE STEEL BARBED HARPOON HEAD; *c*, THE MOP-LIKE WAD, ITS BASE NOT YET PULLED DOWN INTO THE CAVITY WITHIN THE HEAD OF THE SHAFT. 3. LONGITUDINAL SECTION THROUGH THE HEAD OF THE SHAFT SHOWING THE OBLIQUE PERFORATION THROUGH WHICH THE CORD IS PASSED. 4. A KĀDAR BLOW-GUN DART WITH A CLOTH WAD THREADED ON THE BUTT END. 5. THE SAME BEFORE THE WAD IS THREADED ON. 6. THE BARBED DART USED BY THE PUNACHI KĀDARS.

a wad of cloth, a mop of threads or a tapered cylinder of pith. This variety is widely spread throughout the inland parts of Travancore, Cochin, Coimbatore and South Malabar for shooting fish in streams and ponds.

- (3) On the east coast, principally in the coastal region of the districts of Tanjore and Ramnad, wooden blow-guns are largely employed by Muhammadans to shoot small birds. The missile in this case is invariably a clay pellet.

For reasons that will become clear as we proceed, it is probable that the first only is of purely indigenous origin, and that the last has been introduced from Indonesia.

With regard to the Malayali variety some doubt exists. My own opinion inclines to consider it as being of mixed origin, primarily derived from the Kādar type, and subsequently modified by acquaintance acquired of the introduced form as used on the east coast.

The Kādars, who seem to be the principal users of the simple form of blow-gun firing a bamboo splint dart, are a wild tribe of mixed origin, but undoubtedly with a strong negroid strain in their ancestry, as shown, for example, most vividly in the photograph of a Kādar man at p. 13, Vol. III, of Thurston's *Castes and Tribes of South India*. These people inhabit a rugged mountainous region at the junction of the north Travancore mountains with the Anamalai and Upper Palni Hills. The massif here is one of the most inaccessible places in Southern India. The occurrence of blow-guns of simple type in such a region, associated with a tribe in which frizzly hair and a broad negroid nose are met with, suggests that this weapon is a survival of very ancient times and of a former ethnic connection with the Malay Peninsula and Borneo, where the jungle tribes use blow-guns with darts of nearly similar form. It is noteworthy, however, that the weapon is more highly evolved and specialized among these tribes than among the Indian Kādars, the point being poisoned and the barrel of the gun either double, *i.e.*, an inner tube encased in an outer one as customary generally among the jungle tribes of the Malay Peninsula, or of two grooved half-tubes of wood bound together, as used by certain Negrito tribes in Pahang in Malaya (1, p. i), or of tubes bored from solid wooden bars as in North Borneo (5). The Kādar gun and dart are, therefore, the more primitive, and may date back to a time when a Negroid or Negrito race occupied South India and the Malay Peninsula.

I have received samples of Kādar blow-guns and darts from three independent sources, all, however, from the Anamalai Hills, situated within the southern sections of the Coimbatore and Malabar Districts of South India—from Mr. C. R. T. Congreve, M.L.C., of Castlecroft Estate, in the Anamalais, and from the Forest Rangers of Punachi and Tunakadavu through the courtesy of Mr. M. F. Bridge, District Forest Officer of South Coimbatore. Mr. Congreve obtained his specimens from Kādars working on his estate. His information was that the use of the blow-gun has become extinct among the eastern Anamalai Kādars within recent years: the memory of its manufacture is still strong and has enabled them to make the specimens which

Mr. Congreve has forwarded. This gentleman further states : "As far as I can ascertain they used the blow-pipe for killing small birds and nothing else. They use the stone-bow for the same purpose. I do not think they even went in for hunting anything bigger than small birds in this part of the world, as there is very little game of any sort other than elephants and bison in the heavy jungle inhabited by the Kādars, and, from what I have seen of them, they are useless as shikaris and have no notion of tracking, which shows that they have never taken up shikar as a means of getting food. They catch such animals as the mongoose, tree-cat, jungle-fowl, etc., by means of figure-of-four traps set in small hedges made of jungle growth with gaps in them, in which they set the traps, but they never, as far as I know or have been able to ascertain, try to shoot such animals, contenting themselves with shooting small birds only.

"The Mullai Mulsers, Muduvars and a few Kādars who live in a game country down round Perambukolam and in Travancore, on the other hand, go in for shooting game with guns, and *doubtless before the advent of such weapons killed their game with some other weapon.*" That this inference is well-founded is substantiated by Mr. Thurston's statement in 1909 (6, V, p. 98) that the Muduvars "kill with a blow-pipe and dart many small birds." Taken together and in conjunction with those to be mentioned below, these statements are indications of the rapid changes in primitive usages in active progress at the present day among the jungle tribes in the hill districts, where tea plantations have now become numerous : the inducement of good wages attracts these wild folk to the estates, where contact with civilization soon has its usual destructive effect upon many of their distinctive customs.

The Forest Ranger of Punachi, who has had specimens of blow-guns made by Kādarsi living within his range, which lies due south of the Pollachi planting district, where Mr. Congreve lives, reports that these weapons are not now in use there. The length of the guns, he states, varied between 6 and 7 feet, with a diameter from $\frac{1}{4}$ to $\frac{1}{2}$ inch. (The specimen received from him is a length of tubular reed 6 feet $6\frac{1}{2}$ inches long, with a bore of $\frac{3}{8}$ inch.) The darts are made of split bamboo, with wads of cloth on the butt ends. He adds, "they used this for killing birds and small squirrels that were very close to them."

The Ranger of Tunakadavu, situated about 24 miles west of Pollachi, states that the Kādars use the blow-gun to shoot squirrels and small birds, but he gives the length as $4\frac{1}{2}$ feet, with a bore of $\frac{1}{2}$ inch. The specimen received from him is actually 1 foot $5\frac{1}{2}$ inches long, with a bore of $\frac{3}{8}$ inch, which seems the normal inside diameter of the tube. This officer has forwarded both clay pellets and short bamboo splint darts as the missiles used, and he states specifically that both are used at the present day. The pellets are of unbaked clay, just under $\frac{3}{8}$ inch in diameter, the darts being from 3 to 4 inches in length.

Apart from the positive evidence of the Forest Ranger of Tunakadavu, which in itself is conclusive, the validity of the reproductions of blow-guns and darts supplied

by Mr. Congreve and the Forest Ranger of Punachi, as testimony to the former wide range of this weapon among the Kādars, receives striking corroboration from an account furnished to me prior to the receipt of these recent examples by my friend Mr. L. A. Cammiade, Chief Presidency Magistrate, Madras. Mr. Cammiade stated that some twenty-five years ago, when at Pūndi in the Upper Palni Hills, he was informed that blow-guns were in use (*not* by Kādars) in the adjacent Travancore mountains. Two specimens were brought to him. Each was made of a stout reed about 5 feet long that had been straightened by fire. He is, however, unable to give the name of the tribe using them. He added, "An old forest ranger told me that he had seen *similar* ones in use among the Kādars of the Anamalai mountains. He said the Kādars used darts made from the rib of the frond of the sago-palm and put wads of silk cotton at the butt end of the darts. According to him, the darts were about a finger long and were used for shooting down squirrels."

The modern guns vary between $4\frac{1}{2}$ and $6\frac{1}{2}$ feet in length, with a bore of about $\frac{3}{8}$ inch: they are made from reeds of the genus *Ochlandra*, common in the Travancore and Coimbatore forests. There is no ornamentation on the barrel, and, as in the case of those seen by Mr. Cammiade, they occasionally show signs of having been subjected to the influence of fire in the straightening process.

All the darts obtained are made from thin splints of bamboo. They are about $\frac{1}{8}$ inch in diameter, varying in length from 3 to $6\frac{1}{2}$ inches. Those supplied by the Forest Ranger of Punachi show an attempt at unilateral barbing at a distance of 2 inches from the point, where a shallow nick has been made as shown in Fig. 1, 6, running three-quarters round the shaft. The points in all three instances show signs of having been passed through a flame to harden them.

The terms in use by the Kādars for the blow-gun and its projectiles are as follows:—

Blow-gun	.. ..	<i>Odai uttal</i> ("Blowing reed," i.e., blow-tube).
The bamboo dart	.. ..	<i>Māṅgal umbu</i> ("Bamboo arrow").
The clay pellet	.. ..	<i>Kalimannu gundu</i> ("Black-earth ball").

All these terms are ordinary Tamil words and are purely descriptive, as will be seen from the literal translation given above. I consider it probable that they are not the original Kādar names, and are merely the descriptive Tamil equivalents used in conversation between Kādars and the Tamil-speaking forest officers who have gleaned the information here given.

What may be termed the Malayali type of blow-gun as it is in use almost exclusively by the people of Malabar, Travancore, and Cochin, presents a host of variations in detail that surely connotes usage over a very lengthy period and a high antiquity for its invention. It is used exclusively for shooting fish. The only other instance of the blow-gun being used for this purpose is that quoted by Ling Roth (after Burbridge) of the Muruts of Borneo striking fish "with unerring certainty with arrows

from a sumpitan even at more than a foot below the surface of the water" (5. p. 184). There is, however, no close connection between the two, for the Murut dart is simple, whilst that of the Malayali is of harpoon form, wholly unique and confined strictly to South India.

In its simplest form (Fig. 2, 7), as employed by the poorest classes of users, the Malayali blow-gun, or *Tūmbitūn*, is made exactly on the Kādar type.

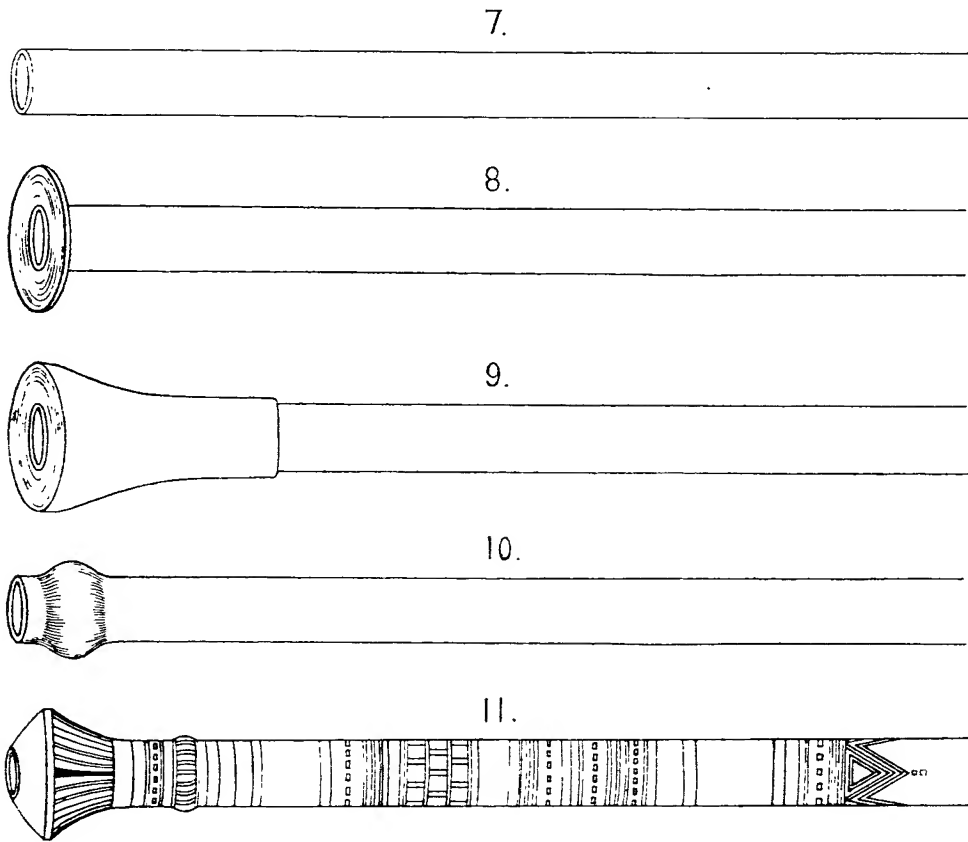


FIG. 2.

7-11. VARIETIES OF THE MALAYALI BLOW-GUN DIFFERING IN THE FORM OF THE MOUTH-PIECE.

7 IS A PLAIN REED TUBE WITHOUT ANY MOUTHPIECE ADDED. IN 8 THE MOUTHPIECE IS A DISC OF COCO-NUT SHELL; IN 9 IT IS TURNED OUT OF WOOD, IN TRUMPET FORM; WHILE IN 10 AND 11 THE ANNULAR MOUTHPIECE IS BUILT UP OF SEVERAL LAYERS OF GUMMED CLOTH PAINTED OVER. THE BUTT END OF THAT DEPICTED IN 11 IS ORNAMENTED WITH BANDS OF YELLOW AND RED ON BLACK. THE BARRELS OF ALL THE ABOVE ARE MADE FROM THE STEMS OF THE *ība* REED.

A reed (*ība*, Mal., *Odai*, Tamil = *Ochlandra* spp.) of suitable length and straightness is sought in the neighbouring forest. If one perfectly straight be found it is taken home and dried thoroughly by filling it with dry river sand. If none quite straight is obtainable, the best is selected and straightened by either of two processes.

The first is by the aid of fire. In this case the crooked section is anointed and soaked with coco-nut or castor or other cheap oil and then straightened over a fire by bending. This done, the whole tube is, as usual, filled with dry sand to extract the moisture remaining and dry it in proper shape.

If, however, the whole length of the reed is slightly curved and not merely bent at one or, maybe, two definite points, then the straightening is done by splitting the reed lengthwise very carefully into two equal longitudinal halves, reversing these end for end and reuniting them by the edges with mucilage obtained usually from the glue-tree (*Diospyros embryopteris*). When this method is adopted it becomes necessary to wind a spiral bandage soaked in the same kind of gum around the whole length of the tube in order to keep the two gummed edges in contact while drying and to prevent the tube cracking subsequently.

This bandage is also very commonly adopted in certain districts (*e.g.*, Pālghāt) even when the reed has not been split and reunited. In others the tube is used in its naked original condition, particularly in places where reeds are abundant or the users very poor. Nowadays the bandaging is done usually with long, narrow strips of mull cloth (muslin) by people called Kuruppans, who are the lacquer workers of the district.

In Pālghāt Taluq it is the general custom to add a built-up ridge or ring round the tube, composed of numerous layers of gum-soaked cloth strips, a short distance beyond the mouth of the gun, to form a mouthpiece against which to rest the lips when blowing out the dart (Fig. 2. 10 and 11). When the gun is dry the Pālghāt lacquerer gives an initial coat of paint over the cloth bandaging of the gun, and when this too is dry, applies a coat of black over the whole length, finally ornamenting 10 or 11 inches of the butt end with a pattern of fine lines of red and yellow lacquer (or paint) according to his fancy and skill. Fig. 2, 11, represents a typical example of this decoration.

In many cases a metal hook (Fig. 3. 14) is attached to the muzzle end to serve as a retrieving hook wherewith to pick up the harpoon line out of the water. This hook may either be bound to the muzzle with wire or twine or by being soldered to a band of thin metal, usually brass, fitted around the muzzle.

In the extreme south of Malabar (Tirur and neighbourhood), a trumpet-shaped mouthpiece turned out of a block of wood (Fig. 2. 9) is slipped over the oral end of the tube. If the tube be lacquered, this mouthpiece is also similarly treated (*vide* a specimen in the Madras Museum): the tube and mouthpiece are also frequently used without any wrapping or painting.

Another variety of mouthpiece is seen among the blow-guns made by Vilku-ruppans at Olavanna and Peruvanna, villages in Calicut taluq, who occasionally cut out a circular disc of coco-nut shell, with a central perforation, and fit this on the oral end of the gun (Fig. 2. 8). At Ponnani I also heard of a tin disc being similarly used as a mouthpiece. As with other details of this interesting Malayali weapon.

great variety in the form of the mouthpiece prevails in the different localities where it is in use.

Side by side with guns made from reeds are to be found, particularly in localities near the coast, a more elaborate form made of wood by the local carpenters. This variety is fashioned on the same principle as those reed guns made by splitting and reuniting two longitudinal halves of a reed stem. Two lengths of wood of the requisite length are taken. Each is grooved on the inner side in semicircular manner, great care being taken to keep the gauge uniform. The outside is suitably rounded. Finally, the two half tubes are glued together by their edges to form a cylinder. To keep them safely in juxtaposition the whole length of the tube is spirally bound with a wrapping that may consist of cloth, bark or animal membrane. A mouthpiece of any of the forms mentioned may or may not be added at the fancy of the owner. Nearly always these wrapped wooden guns are painted black. They may or may not have a lacquered pattern of red and yellow lines on the butt.¹

When the wrapping is not of cloth it is usually of the bast of one of the Banyans (*chēla*, Mal. = *Ficus tsila*) dipped in gum made from the juice of *panachanga*, or *panachikka*, the fruit of *Diospyros embryopteris* (*Panachi*, Mal.). One specimen obtained at Valapad in the extreme south of Malabar, and said by the owner to be extremely old—a heirloom in the family—was wrapped in what appears to be strips of the intestine of some animal, probably a goat (Fig. 3. 13). It had no mouthpiece, but had a retrieving hook soldered to one side of a metal band around the muzzle. Usually these wooden guns are thicker at the oral extremity than at the muzzle. A unique example showing this in extreme degree is in the Cochin State Museum, Trichur: as it was given to the Museum by the ex-Raja, it may be considered as the most elaborate example in existence of the Malayali blow-gun—a weapon made for Royalty (Fig. 3. 12). The length of the barrel is 5 feet 6 inches, the diameter of the bore 16 mm. From the butt, which is enclosed in a turned brass cap, the barrel tapers from a diameter of 42 mm. to 24 mm. The form of the brass cap or mouth-

¹ The blow-gun used by the Indians of the Upper Amazons region of South America is almost identical in detail with such forms, as will be seen from the following graphic description given by H. W. Bates in his fascinating *Naturalist on the River Amazons* (2nd edition, pp. 338-9, 1864). He says: "It is generally 9 or 10 feet long, and is made of two separate lengths of wood, each scooped out so as to form one-half of the tube. To do this with the necessary accuracy requires an enormous amount of patient labour, and considerable mechanical ability, the tools used being simply the incisor teeth of the *Paca* and *Cutia*. The two half-tubes when finished are secured together by a very close and tight spirally wound strapping, consisting of long flat strips of *Jacitara*, or the wood of the climbing palm-tree; and the whole is smeared afterwards with black wax, the production of a *Melipona* bee. The pipe tapers towards the muzzle, and a cup-shaped mouthpiece, made of wood, is fitted in the broad end. A full-sized *Zurabatana* is heavy, and can only be used by an adult Indian who has had great practice. The young lads learn to shoot with smaller and lighter tubes." The darts, however, bear no resemblance to the Malayali form, being made from palm leaf-stalks and winged with silk cotton, the resemblance is therefore to the Kōlar form of dart.

piece is shown in Fig. 3. 12. The sole ornamentation is plain turned circular ridges. The muzzle with its retrieving hook is seen at Fig. 3. 14.

The barrel is formed of two half-tubes of hard wood glued together and bound spirally with strips of fibre, painted black. It is much heavier than usual, though by no means so heavy as many of the guns used on the East Coast, described below.

Most of these wooden guns are made of a hard, dark-coloured wood: in Calicut taluq. I am informed that the tube is made from the wood of the areca palm.

The dart used shows little variation in form. It consists of a wooden shaft 160 to 170 mm. long, a steel or iron single-barbed head about 50 mm. in length, a long carefully-twisted cord connecting the two, and a wad of threads, cloth or pith at the butt end of the shaft (Fig. 1. 1 and 2).

The Malayali terms for its several parts are as follow:—

Pongā, *ponthā* and *alithandu* = the shaft of the dart, which also acts as a float.

Uli = both the dart as a whole and also the barbed steel head.

Kotuppu and *poduppu* = the wad at the butt end of the *ponga*.

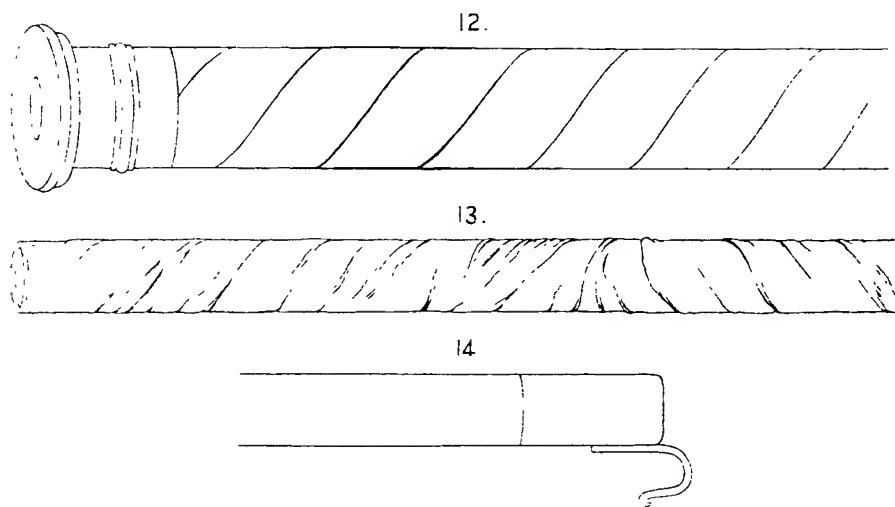


FIG. 3.

12. A VERY MASSIVE WOODEN BLOW-GUN IN THE TRICHUR MUSEUM, COCHIN. THE BUTT END IS ENCASED IN A TURNED BRASS MOUTHPIECE CAP. THE BARREL IS SPIRALLY WRAPPED WITH STRIPS OF FIBRE, PAINTED BLACK. 13. AN OLD BLOW-GUN FROM VALAPAD, SOUTH MALABAR, MADE OF WOOD AND SPIRALLY WRAPPED WITH ANIMAL MEMBRANE.

14. THE RETRIEVING HOOK ON THE MUZZLE OF THE TRICHUR BLOW-GUN

The shaft of the dart is made of various materials in different localities. The principal are: (a) The side twigs of the spiny bamboo, *Bambusa arundinacea* (Mal. *malla ali*), in Pālghāt; (b) areca palm wood in Shertelly taluq of Travancore; and (c) the stem of lemon grass in South Malabar. Whatever be used must be light, or else, as in North Travancore, it must have a pith wad added in order that the shaft shall

float in water and so indicate either the course of the wounded fish or the position of the barbed head if the dart has missed its mark.

The wad on the butt of the shaft in Pālghāt taluq is formed of a mop of short cotton threads, mixed with some thicker woollen ones: red and yellow threads are used, as these are said to be more easily seen in the water. I am by no means convinced with this explanation, as elsewhere (Calicut taluq, etc.) white threads are employed, the reason given for this colour being the same as in Pālghāt for red and yellow.

This wad is attached to the shaft in Pālghāt by one of two different methods: either the threads are tied across their mid-length within a shallow groove encircling the end of the shaft and the lower part reflected upwards to form the mop, or else a conical pit is excavated in the end of the butt, and a hole made obliquely from the bottom of this pit to a point on the outside of the shaft three-quarters of an inch from the butt end (Fig. 1, 2 and 3). The proximal end of the harpoon cord is passed through the centre of a mop of threads, a knot being made on the end to prevent it pulling through. By pulling on the cord the base of the mop is drawn within the conical pit in the butt of the shaft and secured there by a hitch made after passing the cord twice round the shaft.

In Ponnani and to the south (Chetway, Valapad, etc.) the wad is frequently of several disc-shaped layers of cotton cloth nailed through the centre into the head of the shaft.

In certain parts of North Travancore, adjoining the south boundary of Cochin State, an interesting variation is found, where a tapering cylindrical plug of the pith of *thrippulu* takes the place of a thread or cloth wad. This plug is from 1 to 1½ inches long, the distal and tapered extremity truncate, into which the sharpened butt of the wooden shaft is driven. The shaft itself is cut from the stem of the areca palm, according to the information I have received.

The use of a pith plug or wad in parts of Travancore is particularly interesting, as the same plan appears to be employed in the Malay Peninsula, where Knocker (4, p. 295) describes the darts used by the Orang Bukit aborigines of Sungei Ujong "as made from the hard stem of a grass" (*cf.* the lemon grass stem used at Chetway) "fitted with a conical piece of pith." However, in addition, a wad of "wool" is used by these forest tribes of the Malay Peninsula, an addition not employed in Travancore. A pith wad is also attached to the head of the dart in some varieties found in Borneo (5, p. 186).

The form of the barbed head never varies. It consists of a slender cylindrical shaft expanded at the base to permit of a conical hollow being worked in the end, and of a single-winged barb to one side of an attenuate and very sharp point (Fig. 1, 2 *b*). The forward edge of the barb is ground to razor-blade keenness. The distal end of the wooden shaft of the dart is made bluntly conical to fit into the hollow at the base of the barbed head sufficiently loosely to become detached when anything be struck. The harpoon cord connecting the two is very carefully made and is tanned

at intervals to preserve it. The tanning material employed is the juice of *tumbalankai*, otherwise known as *panachinga* and *panachikka*.

When the dart is inserted in the gun this line is wound tightly and evenly around the wooden shaft, leaving no slack (Fig. 1, 1).

Sighting is done with the right eye, and then, moving the head while keeping the arms steady, the mouth is brought up to the gun and the dart expelled by a strong sharp puff.

Boys practice aiming with a plantain (banana) stem as their target : the stem is soft and does not blunt the dart barb.

Local range.—The use of the Malayali blow-gun has a territorial range coinciding approximately with that of the Malayali language, except that it does not appear at the present time to extend north of the Calicut taluq, while, conversely, it extends some distance eastwards into the Tamil district of Coimbatore through the Pālghāt gap—the highway of communication between the Tamil and Malayali peoples. Trivandrum and Vaikom mark approximately its southern limit. Calicut taluq its northern. On the east the Eastern ghauts form the limiting boundary except at the Pālghāt gap, where there is an extension eastwards into the Pālghāt taluq, and where it is in general employment.

In no locality is this form of blow-gun used except for shooting fish. Its use is not restricted to any caste or section of the population ; all those who eat fish use it, but more for sport than as a means of livelihood. Usually Muhammadans (Mappillas) take most interest in this weapon, the sporting instinct being stronger with them than among Hindus.

It is used neither on the coast nor on the main backwaters : chiefly along the banks of clear streams, pools and tanks.

The murels (*Ophiocephalidae*) are said to be the chief fishes shot, as they have the habit of frequently coming to the surface of the water, where the trouble caused by refraction can be ignored when aiming. The sportsman will sit for hours at the side of a tank, patient and immobile, with his blow-gun in readiness, waiting for a fish to rise : usually he "fires" without taking conscious aim, so I am told. The Grey Mullet (*Mugilidae*) and the Pearl-spot (*Etroplus suratensis*) are other fish sometimes shot with the blow-gun.

In most localities the use of the blow-gun is much more restricted than formerly : in a few years it will be a forgotten art in many places. A cross-bow, shooting a harpoon dart similar to that used in this form of blow-gun, is supplanting it as being more effective, just as the catapult is ousting the blow-gun for shooting birds on the East Coast.

The East Coast blow-gun (*Sumpithān* in Tamil)¹ is invariably made of wood² : the missile is a clay pellet. It is used for shooting small birds, and appears to be

¹ As the users say, this is the name used in Singapore and Penang, there can therefore be little doubt that it is the Tamil rendering of *Sumpitan*, the Malay term for the blow-gun.

² Brass tubing has been tried as a substitute, but it is condemned as useless, as it is too liable to become bent.

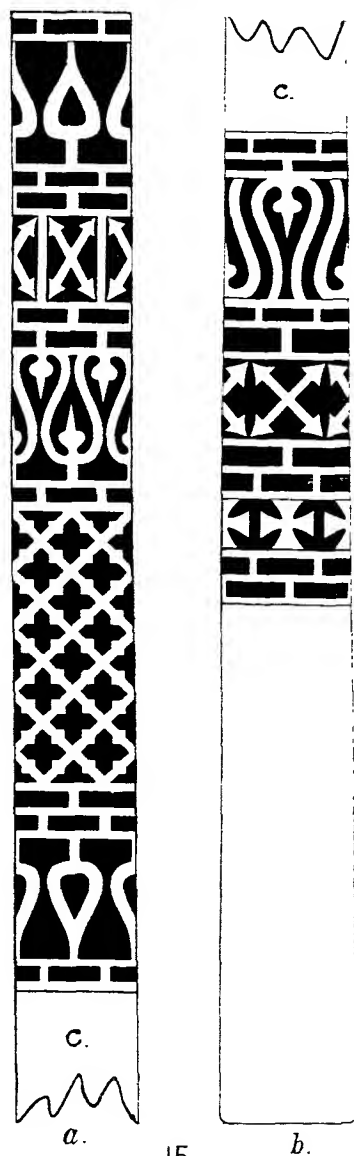
employed for this purpose almost entirely by Muhammadans. In Tanjore, however, Mr. S. Somasundaram Pillai, M.L.C., informs me it was formerly used (and probably is to the present day) by pigeon rearers of all castes to scare away stranger birds. Its range, so far as I have been able to determine it, extends along the whole of the seaboard of Ramnad and Tanjore districts and thence north along the Coromandel coast wherever Muhammadan centres exist. It is particularly common at Kilakarai, Tondi, Tirupalakudi, Negapatam and Nagore, and again at Pulicat, 27 miles north of Madras, the most northerly point to which it has been traced as yet.

Two varieties are seen, one made by boring a tube through a solid length of timber: the other fashioned of two longitudinal halves, each with a semi-cylindrical groove on the inner face, the two halves being glued together in the same way as the halves of a wooden lead-pencil cylinder. The former are imported almost entirely from Singapore and Penang: many of the latter also come from the same places, but a certain number are made locally, especially at Tondi, Negapatam and Nagore, by local carpenters. The single-piece wooden blow-gun is seldom made in India, but I have seen one example and the tools and appliances used in making it at Tondi, in Ramnad District. Those who bring the solid form of gun from Singapore state that they buy them from Chinese traders. These particular guns are most highly esteemed as being particularly strong and serviceable. Usually they are decorated both at the muzzle and at the butt with inlaid white metal ornamentation in handsome conventional patterns. A very fine example for which the owner said he had paid forty rupees (thirty more probably!) was shown me at Kilakarai: the scheme of decoration is reproduced in Fig. 4. The local people believe the metal to be lead and use this in the rough imitations they produce: it is, however, pure tin, brighter and more lustrous when polished than lead, and harder. In making this inlay, as imitated at Kilakarai and Nagore, the pattern is first marked on the barrel and then gouged out to the requisite depth: when finished, molten lead is run into the pattern. The lengths of the solid imported guns vary considerably, ranging from 5 feet 8 inches to 6 feet 9 inches. The home-made ones composed of two half-tubes, seen at Tondi and Tirupalakudi, run considerably longer, the four measured being respectively 6 feet 11 inches, 7 feet, 7 feet 5 inches, and 7 feet 9 inches. The greater length of these latter is obviously due to the ease with which barrels made on this principle can be constructed as compared with those bored from the solid.

The external diameter of the butt end varies between 25 and 30 mm., that of the muzzle 19 to 23 mm. The bore averages 14 mm. in diameter, varying within slight limits.

In weight there are still wider differences, due mainly to the amount of metal inlay present. In the example figured the butt end is covered entirely with metal, hiding the wood completely; this example weighed $5\frac{1}{4}$ lbs. The diameter at the butt was 25 mm.; at the muzzle 20 mm., the bore throughout being 14 mm. Three

other representative guns weighed respectively 3 lbs., $3\frac{1}{2}$ lbs. and 4 lbs.¹ The greater part of this weight is due to the fact that the butt end for a distance of from 35 to



15.

FIG. 4.

THE METAL INLAID BUTT AND MUZZLE END OF A BORNEAN BLOW-GUN IMPORTED INTO SOUTH INDIA FROM SINGAPORE. *a*, MUZZLE END; *b*, BUTT. THE TIN INLAY IS SHOWN IN WHITE. EXCEPT AT *c*, WHERE THE UNORNAMENTED PORTION OF THE BARREL BEGINS.

¹ Dr. E. Nyöberg, Curator of the Sarawak Museum, informs me that two typical Bornean blow-guns in that collection weight 2 lbs. 1 oz. and 2 lbs. 9 ozs., respectively. He states that horn as well as tin is employed in forming the inlaid ornamentation so characteristic of this variety.

100 mm. consists of solid lead (or tin), pierced with a bore continuous with that of the wooden part of the barrel. The wood itself is of a heavy character, that of the guns bored from the solid and imported from the Straits Settlements being of a dark red wood, apparently that of a palm.

These guns are frequently provided with a single sight placed at a distance of about 130 mm. from the muzzle. Usually a piece of wax is used for this purpose, as it can be moulded by the heat of the fingers to the requisite height whenever the gun is to be used. At Tondi, I was told that it is customary to smear the sight with the blood of the first bird killed to ensure "good luck." In one I noticed a metal pin had been substituted for the wax sight. Clay is also employed, and in one fine example seen at Tirupalakudi the sight consisted of a large paste ruby set in silver and attached to the barrel by an encircling silver band. The more expert marksmen do not use a sight, stating that they do not require one, as they can take an alignment over the distal end of the tube, aiming a little below the object. At 35 feet their aim is accurate: a range of 40 feet appears to be about the limit. Some men become very expert and make a living during the season by shooting small birds, of which they may shoot a dozen or even more within an hour. To expel the pellet with sufficient force to stun a bird at this distance requires the expenditure of considerable force. The barrel is occasionally lengthened by adding lead at one end by those who from long practice find themselves able to blow the pellets through with ease: the longer the barrel the more accurate is the aim, but with each increase in length the greater effort is called for to propel the pellet.

The Kilakarai users of the blow-gun generally support the barrel with one hand at a distance of 15 to 18 inches from the mouth, the other hand supporting it close to the mouth (Pl. XXXV, Fig. 2). At Tondi, on the contrary, the custom is to hold the gun with both hands close to the mouth (Pl. XXXV, Fig. 1), the manner customary in Borneo and South America and also in Malabar.

From the character of the decoration—its conventionalized phyllomorphic design—and more particularly from the fact that a "sight" is present, it seems certain that these highly-decorated bored-out blow-guns have been made in Borneo: the style of the decoration is precisely that employed by certain tribes in that island, and the Bornean blow-gun is, so far as I can ascertain, the only one provided with a sight. The fact that these guns are obtained through the intermediary of Chinese traders (or Bugis, according to Dr. Annandale) falls into line with this conclusion: these men penetrate everywhere into the interior of the islands of Indonesia to barter for anything, however trivial, that they know has value in the eyes of one or other of the many races represented in the floating population of Singapore and the other emporia of the East. The locally-made guns of two grooved pieces of wood glued together are fashioned in this way because, so far as I can judge, the Indian carpenters who make them seldom have the skill or the instruments necessary to bore a tube sufficiently true through a long length of wood. To meet the difficulty the plan

employed in Malabar of half-grooving two pieces of wood, and derived primitively, I believe, from the custom of splitting a slightly-crooked reed into two longitudinal halves and of reversing them before rejoining by the edges, has been followed with improvements. The whole tube is more massive than the Malay one, and, in order to approximate in appearance to that of the Bornean solid barrel, the two half-tubes used in the imitation form may even be tongued and grooved on the edges so that, when glued together, they may adhere sufficiently firmly to need no strengthening such as the Malayalis resort to by spirally bandaging the barrel with strips of cloth, bark or animal membrane. In some cases a band of brass is fitted on for security at the butt end and at the muzzle, and sometimes a third one is fitted at mid-length.

Other methods of keeping the two halves in position not uncommonly practised are to sew a leather jacket on the barrel (Tirupalakudi and Pulicat) or to serve it with hard twisted cord (Tondi and Tirupalakudi). At Tondi an additional precaution was seen in some cases, where hard wooden pins were inserted at intervals apart of 8 inches on alternate sides of the tube, pegging the two halves together.

The precise method of strengthening the tube as a precaution against damage depends largely on the predilection and skill of the local carpenter or of the owner—the custom varies even locally.

Occasional examples of the solid-bore blow-gun made in India are to be met with, but they are very rare, chiefly because few Indian carpenters have either the knowledge or the skill, and to a less extent on account of the greater cost as compared with the nearly equally efficient two-part barrel. At Tondi, a small seaport on Palk Bay, where there is a considerable settlement of Labbai Muhammadans, I was fortunate to meet a Labbai carpenter who made both forms of barrel. He told me that the great majority that he made were of the compound form: if the buyer was prepared to pay enough he was prepared to bore a barrel out of the solid. He showed me one of the latter and also brought out the appliances he used in boring the tube. As shown in Fig. 5, 16 and 17, this consists of an upright beam fixed firmly in the ground, and of several brackets with apertures in the centre to hold both the bar of wood to be bored and the long auger used for the purpose. The wooden bar was first squared with precision, then the angles were reduced equally to such an extent that the bar may revolve within the apertures of three brackets which are screwed vertically one above the other to one face of the upright beam or post. Each bracket is of two pieces, with a half-circle cut out of the opposed edges, the whole fashioned somewhat after the style of the two planks used in the ancient "stocks" (Fig. 6). The tube is bored out *from below* by means of an auger as long as the barrel to be bored. As a consequence it is inverted, the point being turned upward. The shape is as shown in Fig. 5, 17. For some inches below the peculiarly-shaped point the steel shaft is hand-shaped: this merges into a spiral of about the same length, and then comes another short length, square in section, to which is welded several feet of iron rod, terminating in a large "eye." Through this "eye" a wooden bar is passed to serve

as handle. When all is ready the wooden bar to be bored is clamped within its brackets: the auger is similarly clamped and the end of the wooden bar brought down upon the point of the auger. One man now squats on the ground holding the auger handle firmly, while a second slowly revolves the wooden bar, pressing its end

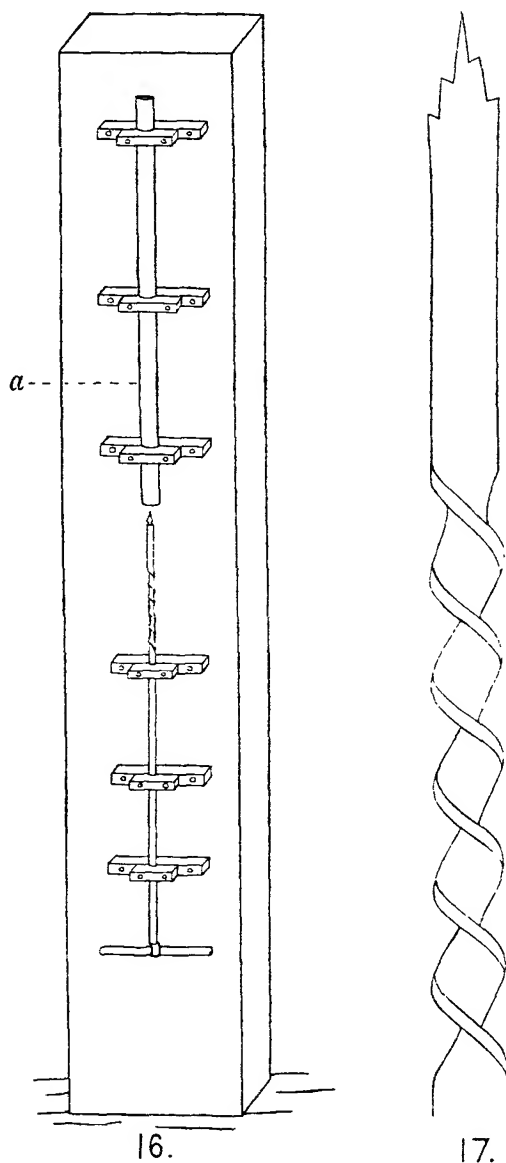


FIG. 5.

16. DIAGRAM TO SHOW HOW THE LENGTH OF WOODEN ROD *a* IS HELD UPRIGHT AND TRUE BY MEANS OF BRACKETS WHILE BEING THRUST DOWN UPON THE AUGER POINT BELOW. AS WILL BE SEEN, THE AUGER IS ALSO HELD TRUE BY MEANS OF BRACKETS.
17. STEEL AUGER HEAD USED AT TONDI TO BORE OUT THE BARREL OF A WOODEN BLOW-GUN.

with gentle but firm pressure against the auger. The latter is not rotated. As the perforation of the bar proceeds, adjustment of the clamping brackets has to be made from time to time. The work is extremely tedious and obviously necessitates the greatest of care to obtain a straight and perfectly true bore. At Tirupalakudi, an old Labbai, whose appearance suggested Malay blood in his veins, told me that he had seen blow-gun barrels bored in Penang by Malay carpenters. He added that Chinese carpenters made only those formed of two half-tubes glued together. According to my informant, in boring from the solid the Malay carpenter secures a suitable length of timber very carefully in a vertical position by clamping it to some straight upright post and then from below uses a very long rod-shaped auger, *stayed carefully by means of brackets*, to bore out the tube. This method is, therefore, midway between the one employed at Tondi and that given by Crocker, as quoted by Ling Roth (5, p. 184), of the method in use in Borneo, where the length of wood to form the barrel, after being clamped upright to a post, is bored through from below by means of a

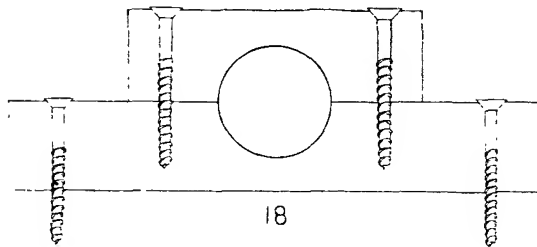


FIG. 6.

THE FORM OF A GUIDE BRACKET. SHOWING HOW IT IS HELD TOGETHER AND ALSO ATTACHED TO A VERTICAL BEAM BY MEANS OF FOUR LONG SCREWS.

[I have to thank my assistant, Mr. K. R. Samuel, for the contribution of the above drawings, made either from the actual objects or from my field sketches.]

long chisel-ended auger, which, however, is not stayed in any way. The chief peculiarity of the Tondi method is the revolution of the wood to be bored and the fixity of the auger—the converse of the Bornean and Malay procedure.

Metal decoration is occasionally attempted on the Indian coast, but the result is usually a travesty of the Bornean. Lead is used for the inlay in place of tin, and, although the worker has access to fine examples of imported work, he seldom exhibits skill even in copying. The balance of the original *motif* is lost and the workmanship so un-skillful that a design owing its beauty to the perfect symmetry of its detail is spoiled utterly. Exceptions are, however, met with, most successful when not slavish imitations of Bornean designs.

No mouthpiece is used either in the solid barrel form or in the compound barrel one, for none is needed: when about to shoot, the extremity of the metal butt is placed between the lips.

The missile is a round pellet of clay rolled to shape between the hands or, as is now frequent, by pressure within an ordinary bullet mould. The pellets are made from a lump of tenacious clay just before use. A reserve of sun-dried pellets is frequently carried in the breast pocket of the shirt in case the supply of clay gives out should birds be plentiful. Immediately before aiming a pellet is put into the mouth, whence it is introduced into the tube by the tongue immediately after aim has been taken.

It appears evident that the East Coast blow-gun, shooting clay pellets, is an Indonesian weapon introduced into India in the course of that long-standing intercourse between South India and Indonesia in general, and between Negapatam and the Arab Settlements in the Malay Archipelago in particular. The Labbai Muham-madans of the south-east coast of India are found in all the big coastal centres of population in the Malay Peninsula and Indonesia, working chiefly as harbour coolies, boat people and petty traders. Under the Dutch arbitrary classification of the non-native population of their coast towns into Europeans, Chinese, Malays and Arabs, the identity of these men is obscured, as they are included as Arabs, to the confusion of the ethnologist if he has not visited South India and is not acquainted with the Tamil-speaking Labbais and their distinctive sectional names of Marakkayar, Rowthan and Labbai. In few, indeed, is there any infusion of Arab blood, except among the Marakkayar or superior section, where an Arab physiognomy is occasionally traceable. These people, whose blood is preponderantly derived from an Indian origin, in common with their Hindu brethren, have the homing instinct strongly developed, hence a continual intercourse with the homeland and the introduction of several foreign items into their old homes in India. Among such we may certainly count the pellet blow-gun.

Conversely, there seems no reason to doubt the conclusion that the Malavali harpoon blow-gun and dart are fundamentally of indigenous origin, derived ultimately from the very ancient and primitive Kādar form of gun firing a simple dart. The harpoon form is unique and certainly indigenous, and also its employment for shooting fish.

It is significant that this form is limited to the inland parts seaward of the Western Ghats, and that the Kādars live in the forests covering the western aspect of these hills in their wildest and most inaccessible region in South India—the massif where the Anamalais join the Travancore hills. It is worthy, too, of special notice that the Kādār location is roughly equidistant from the northern and southern limits of the harpoon blow-gun in Travancore and Malabar. Had the use of the weapon spread radially from the Kādar country south-west and north-west, we should have a distribution exactly like what we now have.

It is equally significant that the blow-gun, while widely spread among the Malayalis, is not known and seems never to have been used among their neighbours, the Tamils, except in the introduced pellet form along the seaboard of Tanjore and Ramnad. If it proves nothing else, this proves how cut-off from one another were

Kerala and the Tamil country prior to the era of British-made roads and railways. It also suggests, when taken in conjunction with other evidence, that the Malayali is largely of a different racial stock from the bulk of the Tamil population. But this is a subject too large and complicated to treat of here.

The frequent local differences seen in the details of the Malayali gun and dart betoken also, in a minor degree, the difficulties which we know did beset intercommunication by land in the Kerala of the old times. The estates of the many petty rajas that existed prior to the consolidation that began to set in after the arrival of the Portuguese were largely self-contained. Some natural feature—a river or a forest—frequently served as boundary to these principalities, each of which was an entity by itself. Hence local divergence in customs and in language frequently resulted and became fixed and so is perpetuated to-day, although intercommunication is much improved. But even yet isolation reigns in some localities, and trammels the lives and thoughts of a large section of the population. The ignorance and fanaticism bred of these conditions were, indeed, among the mainsprings of the recent Mappilla rebellion.

It seems probable, however, that Indonesian influence, not necessarily direct, has caused the substitution in certain localities—notably those adjacent to the coastline and to ports—of a wooden barrel made of two grooved halves, for the primitive hollow reed. In favour of such modifying influence, exercised probably at second-hand through sea communication with the Labbai centres on the coast of Ramnad and Tanjore, is the fact that the name it goes by almost universally in Malabar is *tūmbitān* (in Quilon, I am told, the local name is *kīlang kullal*, “kullal” being Tamil for tube).¹ *Tūmbitān*, in common with the Tamil name, *sungutān*, is obviously a variation or corruption of the common Malay term for this weapon—*sumpitan*.²

¹ In the south of Travancore the Tamil language persists as the local vernacular; this region from Quilon southwards was formerly part of the Pandiyan Tamil kingdom and did not belong to Kerala, the Malayali country.

² It is noteworthy that the Portuguese, by the adoption into their language of a corrupt variant, *zarabatāna*, of the same word, have spread a form of the Oriental term for blow-gun far into the forests of Brazil, where, as recorded by Bates of the Tefé tribes (2, p. 338), *zarabatāna* is in general use for this weapon; it has in many places supplanted the native or indigenous terms such as *dolike* and *obidake*, which are now employed only by tribes little influenced by Portuguese contact (7, p. 108).

According to Portuguese lexicographers, *zarabatāna* is derived from an obsolete form, *zabatāna* or *zarbatāna*, and this in turn from the Arabic *zabatāna*. The last is undoubtedly a corruption of the Malay *sumpitan*; the Arabs normally change *p* into *b* when rendering foreign words, and the *m* would tend to be elided owing to their difficulty of pronouncing two consonants when they occur together.

The term *jangāda* is a parallel instance of an Oriental word transplanted to Brazil by Portuguese agency. It is applied in Brazil (as in Portugal) to any raft-like structure, to the exclusion in the *língua geral* of the original or indigenous name; it is in reality a term borrowed from the Dravidian languages of South India, where a raft consisting of two canoes lashed parallel to one another is termed *savādāna*, *chunqādam*, or *jangālu*, according as the language is Tamil, Malayali or Tulu (3, p. 148).

Whatever doubt there may be in regard to the amount of influence exerted from outside sources upon the Malayali blow-gun, there can be none in deciding that the Kādar type is wholly of indigenous origin. It appears to be a primitive and perhaps degenerate form of that used by the wild forest tribes of Malaya and South America, who, however, always poison the tips of their darts. In its existing form as still used by a section of the Kādars and Muduvars, and very probably by other jungle tribes in the Travancore mountains, it is a weak weapon of little use except against quite small birds and mammals. Mr. Congreve (*supra*) has stated that the Kādars show little skill in hunting. This statement, however, applies only to a section of the tribe, as he adds that the "Mullai Mulser, Muduvars and a few Kādars in a game country down round Perambukam and in Travancore, on the other hand, go in for shooting game with guns, and doubtless before the advent of such weapons killed their game with some other weapon." I am strongly inclined, therefore, to believe that the present form of the Kādar and Muduvar dart is an emasculated form derived from one of vigorous killing power, in which the tip was poisoned. Several indications seem to point to such a conclusion. The very futility of the present form for killing purposes is one of the strongest; the presence of an indication of barbing in the examples from Punachi is another (Fig. 1. 6), and it is very significant that the Kādars have a legend, according to Mr. B. M. Behr, a planter of wide experience in the Malabar Wynaad, that there exists a tribe of pygmies in the Travancore forests who *do* use poisoned darts in connection with blow-guns. It is quite possible that this belief or legend does not relate to any existing tribe, but is a tribal memory dating back to some distant period when poisoned darts were in ordinary use. The mere fact that such a story exists has considerable value and significance.

It seems extremely probable that the Kādars and Muduvars, like other wild hill-tribes, have had to give up the use of poisoned weapons since they came under British rule; the present generation may even have forgotten the art of preparing the poison. A parallel instance mentioned to me by Mr. Cammiade strongly supports this view. He informs me in a letter recently received that, in the Godavari Agency tracts, the Kois formerly made use of poisoned arrows. Even the plant from which the poison was made was well known formerly and is recorded in the early accounts of this region. Nowadays, however, the Kois certainly do not use poisoned arrows, and when Mr. Cammiade actually named to them the poison that was employed they seemed honest in their declarations of ignorance of such use. Mr. Cammiade states that even when he drew their attention to the poison grooves which still survive in the fashioning of the present-day arrow heads, they maintained that the grooves are there for the purpose of improving the flight of their arrows.

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II.—SOUTH INDIAN BOOMERANGS.

Beyond the mere fact that curved throwing sticks or boomerangs are used in a certain locality in South India, few details concerning them appear to be known. The longest notice is that in Thurston's *Castes and Tribes of Southern India*,¹ where Oppert is quoted² as stating that this weapon is used by Maravans and Kallans "when hunting deer." The name given by Oppert is "*valu tude* (bent stick)." A letter from the late Mr. R. Bruce Foote is also quoted, giving the dimensions of a specimen in his collection said to be made from the wood of tamarind root. An account of a general hare hunt by Maravans in Sivaganga is also given, and Bruce Foote was told that this was in pursuance "of a semi-religious duty in which every Maravar male, not unfitted by age or ill-health, is bound to participate on a particular day in the year."

No reference to any differences in form of these weapons has been published, hence the following note may be of some utility when considering the possible affinities of the Indian boomerang with those of other regions.

Towards the end of 1922 I obtained four examples from villagers in the Ramnad district. Two of these (Nos. E and F of the text-figure, p. 337) are of the typical form described by Bruce Foote (*ut sup.*); the other two diverge considerably. The wide extent of the differences in the form and dimensions will be realized on reference to Nos. C to F of the text-figure. The principal details are as follow:—

Specimen.	Weight.	Length along outer curve.	Chord of the arc.	Width of distal end.	Thickness of distal end.
	lb. oz.	cm.	cm.	cm.	cm.
1. Bruce Foote's larger specimen	(?)	61·28	44·77	6·0	circa 2·2
2. No. E of the text-figure	1 1	58·10	51·43	4·4	1·7
3. No. F	1 0½	66·00	51·00	4·2	1·3
4. No. C	1 2	80·00	74·50	4·0	2·2
5. No. D	0 10¾	81·00	75·50	2·0	2·0

The most typical are 1, 2 and 3. All of these have a gripping knob at the narrow or proximal end. Beyond this handle the width increases extremely gradually to the

¹ Thurston, E. Vol. V, pp. 46-47. Madras, 1909.

² *Madras Jnl. Lit. Science*, XXV (as quoted).

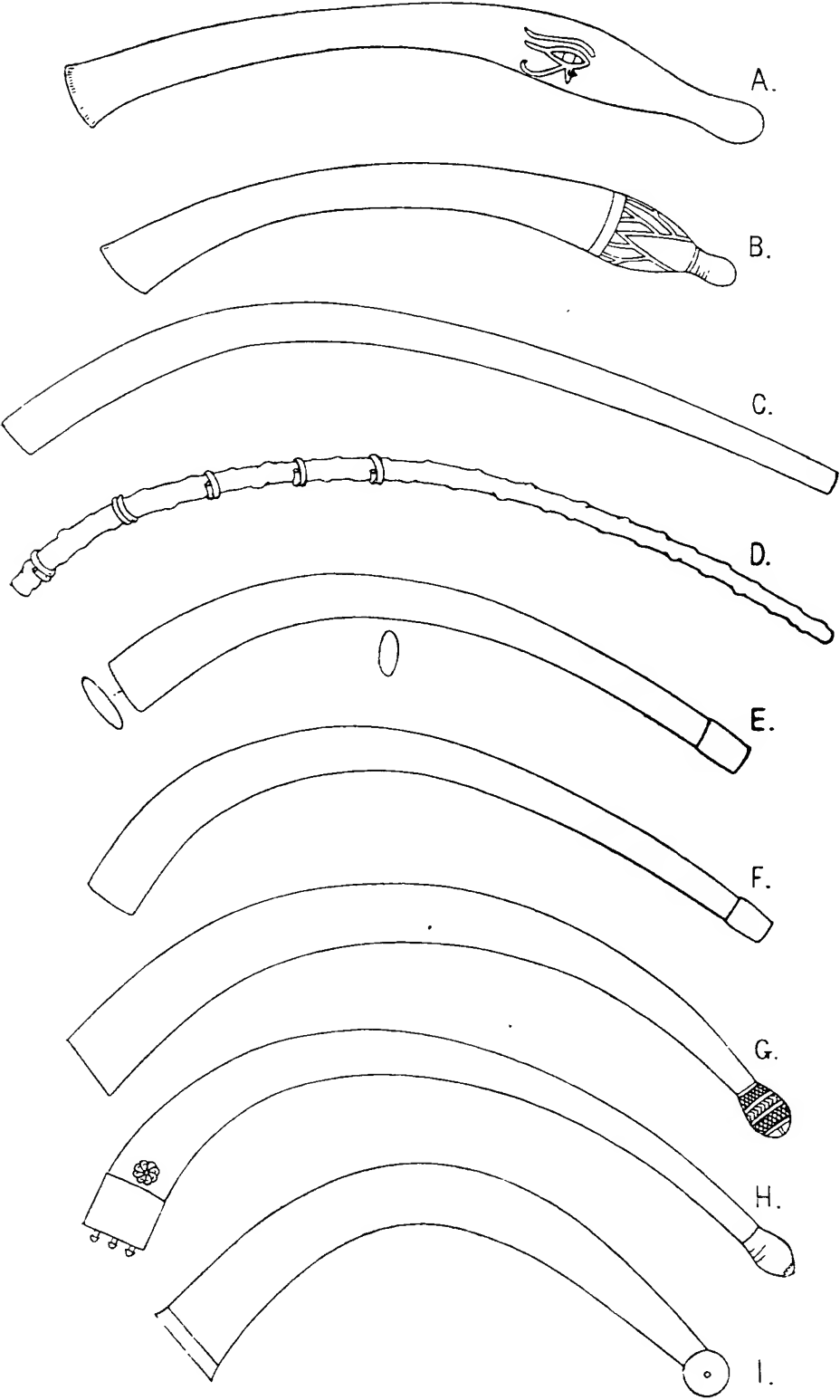


FIG. 1. (See p 346.)

distal extremity, at the same time becoming laterally compressed to form a stout wide blade. The thickest part is usually a few inches from the distal end, which is abruptly truncate.

Specimen 2 (No. E), of dark reddish-brown colour, is said to be made of tamarind wood: the third (No. F), an old and much-worn specimen, cannot be determined. Both of these have the same general appearance as the eight examples possessed by the Madras Museum, the main difference being in the degree of curvature of the blade. As the majority of the Museum specimens appear to be ceremonial in character (Nos. G, H and I of the text-figures), whereas mine were obtained from villagers who actually used them in the chase, the proportions of the latter are to be preferred as truly representative of the Maravan type of boomerang.

The other two that I obtained (Nos. C and D) are distinctly of a different type. The first (C) was obtained from a Muhammadan (Labbai) in Vedalai village, Ramnad district. This man had had it made and had used it for a long time in hare hunting. It is considerably longer than the usual type (80 cm. as against 58 to 66 cm.). It is also less strongly curved, particularly in the proximal region, where it is practically straight for a considerable distance. No special grip knob is provided.

No. D is still more aberrant. It consists of a long curved natural branch, circular in section, cut from a common local tree called *valathai* in Tamil. The length is 81 cm. along the outer edge, and the comparative slightness of the curve approximates to what we see in No. C, characteristics which place these two in a separate class. The distal half of the stick is loaded with five double rings of iron at intervals as shown in the illustration, a unique feature so far as I am aware.

It will thus be seen that there is very considerable variation in the form of the boomerangs actually employed in hunting at the present day, due either to personal preference or, more likely, to considerations of expense, as the typical form requires the employment of a specially heavy and tough wood not easily procurable (tamarind trees are seldom felled) and necessitates skill to rough out, and considerable time and trouble to shape.

The South Indian boomerang is employed primarily in hunting hares; deer and partridges are also sometimes struck down with this weapon. I was informed that the short, broad type is used for hunting all these animals, whereas the long one is never used for birds (partridges). None of these Indian boomerangs can be made to return to the thrower.¹

At Vedalai the terms *vāḷari kām̃bi* and *vāḷavādai kām̃bi* are in use to denote the boomerang: *vāḷari* = bent or curved and *kām̃bi* = stick, while *vāḷavādai* is the name given to the curved seed case (fruit) of the tamarind tree. The *vāḷari kām̃bi*

¹ Note by H. Balfour—Colonel Lane Fox, in the Catalogue of his Anthropological collection, 1877, p. 39, states that "An improved form of this weapon is used by the Marawars of Madura, and some of these are much thinner than the boomerangs of the Kols, and in practice I have found them to fly with a return flight like the Australian boomerang."

is the traditional weapon of the warrior Maravar caste, of which the Rajas of Ramnad and Sivaganga are the heads. The traditions of the country and of the caste are fond of recounting the exploits of local heroes skilled in the use of the boomerang, on lines similar to the old English tales of the prowess of Robin Hood. I was also told that so identified used the Maravan to be with his own particular ceremonial boomerang that on occasions when circumstances prevented him from appearing personally at any ceremony, even though it might be his own marriage, it sufficed if he sent his boomerang to represent him.

In pre-British times the boomerang was used by this caste in warfare: in such case aim was taken at the ankles of the foe.

The ceremonial use of the boomerang above referred to receives confirmation when we examine certain of the specimens in the Madras Museum. Several of these are of ivory, one is of iron or steel (No. I of my text-figure), and another is of wood ornamented with metal work which would be at once damaged if used in hunting (No. H). These particular examples are undoubtedly ceremonial weapons, the insignia of their owners.

At the present day many of the country people in the districts of Madura and Ramnad, and in parts of Tanjore and Tinnevely, as also in the State of Pudukkottai, who indulge in hunting, use the boomerang. Thus we find Vellalas, Valliyans, Nādars (Shanars) and Muhammadans using it, though, of course, less freely than the Maravans and Kallans, with whom it is particularly identified.

Whether this Indian weapon has a common origin with the better-known forms from Australia cannot as yet be determined. That it is closely akin and has been derived from the same source as the ancient Egyptian boomerang is, however, extremely probable when one institutes a comparison of the typical form as depicted in Nos. E to I, with Nos. A and B, which are outline copies of two specimens from Tut-ankh-Amen's tomb, taken from photographs given in *The Times* some months ago. Many of the ancient Egyptian boomerangs seen in our museums are probably funerary and conventionalized models or symbols, not adhering rigorously to the form of the actual weapon and not made to scale. The two figured are full-sized, and while we must necessarily infer from the material of which they are made being electrum, and from the rich ornamentation seen upon them (omitted from the outline copies almost entirely), that they were for ceremonial display and not for actual use—as with the modern ivory and decorated specimens in the Madras Museum—we are, I believe, justified in believing them to be replicas in form of such as were used for hunting. One famous Egyptian wall-painting shows a fowler aiming with a boomerang at some birds, and, until I saw the photographs of the Tut-ankh-Amen weapons, the peculiar form of the one depicted in the painting puzzled me. I am now inclined to think that the form there depicted has suffered at the hands of the artist, and that it is not an accurate representation, any more than are those of the lotus flower in the same scene.

The Ancient Egyptian boomerangs as exemplified in the Tut-ankh-Amen specimens are less curved than in the most typical South Indian ones (Nos. E and F), but approximate closely in this respect to Nos. C and D. They are, however, of a stouter form: instead of tapering gradually from the flattened blade to the handle knob (which they have in common), they expand into a peculiar and very characteristic swelling at this point (Nos. A and B). Considerable ornamentation is lavished upon this swollen region: in No. A part of this takes the form of the *uchat* amulet, the eye of Horus. Apart from the distinctive bulge, which perhaps is an exaggerated feature, as is the extremely deep curve of the ceremonial iron South Indian specimen figured as No. I, these Egyptian boomerangs show a surprisingly close resemblance to certain of the Indian ones, particularly Nos. G and H.

As the South Indian boomerangs are in use by people believed to be of Dravidian race, this practical identity of their most characteristic weapon with one employed in ancient Egypt is further evidence in favour of my belief that the main mass of the people of South India, excepting certain of the low castes or, rather, out-castes, and some of the coast-folk and hill-tribes, are of common origin with an important racial element in the ancient Egyptians. If so, we perceive the full significance of the fact that a language, the Brahui, of distinctly Dravidian affinities, is still spoken in one area in Baluchistan. Equally significant is the survival among the Kols of Guzerat of the use of boomerangs, the commoner form, for there appear to be two, being practically identical with the South Indian and Egyptian type.¹ The Guzerat Kols do not now speak a Dravidian language, but from various indications it is certain that Dravidian was once spoken over a much greater area than that covered by it at present: the probabilities are great that this ancient Dravida extended at one time from Baluchistan southwards through Guzerat and the Deccan to the shores of the Gulf of Manaar, and that there then existed over the whole of this area a large series of characteristic and distinctive customs which included the use of the boomerang, of shell bangles, of the blowing conch, of *catamaran*-like rafts, the decoration of their boats with *oculi*, and probably the custom of urn-burial.

The examples figured as Nos. C, D and F have been deposited in the Pitt-Rivers-Museum, Oxford, while No. E has found a home at the University Museum of Archaeology and Ethnology, Cambridge.

¹ Lord Egerton of Tatton in *A Description of Indian and Oriental Armour*, new edition, London, 1896, figures two forms of boomerangs from Guzerat, in the India Museum. The first is rather sharply curved at mid-length, flattened laterally, the two ends similar and without the knob-like handle characteristic of the South Indian type. Length, 2 feet 6 inches to 3 feet along the outer curve. Lane-Fox is quoted as saying, "These boomerangs conform to the natural curve of the wood like the Australian boomerangs which they resemble in form." The second Guzerat type, apparently the more common, is similar in form to the South Indian, one end having a knob-like handle: the blade is stout, curved in sickle-form, and embellished with brass and steel mounts, plain or engraved, another feature in common with those from South India. The length is given as 22 inches. Further information concerning these Guzerat boomerangs is greatly needed. [See also Colonel Lane Fox, *Journ. Roy. United Service Inst.*, xii, 1868, p. 426, etc.; xiii, 1869, p. 2, etc.; *Journ. Anthropol. Inst.*, xii, 1882, p. 454, etc.—H. Balfour.]

III.—SOUTH INDIAN CROSSBOWS.

In South Malabar, Cochin, and Travancore, in Southern India, a somewhat elaborate type of crossbow is in extensive use. It is employed almost exclusively to shoot fish in the streams and backwaters that there dominate the lives and occupations of the people. During a tour in Malabar in 1923 I was able to collect particulars relating to its employment, as well as several typical examples. As no description of this appliance has been published, and as its construction and origin are noteworthy, I have incorporated all the particulars known to me in the following note.

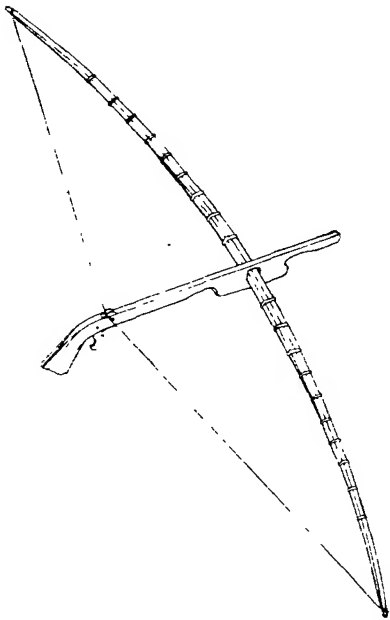


FIG. 1.—A MALAYALI CROSSBOW WITH AN EXCEPTIONALLY LONG TWO-LEAFED BOW AND RELATIVELY SHORT STOCK. AN UNUSUALLY FINE SPECIMEN. FROM ARATHINKAL, TRAVANCORE. (FOR THE SAKE OF CLEARNESS, THE ARROW GROOVE AND THE LINE RECEPTACLE ARE OMITTED.)

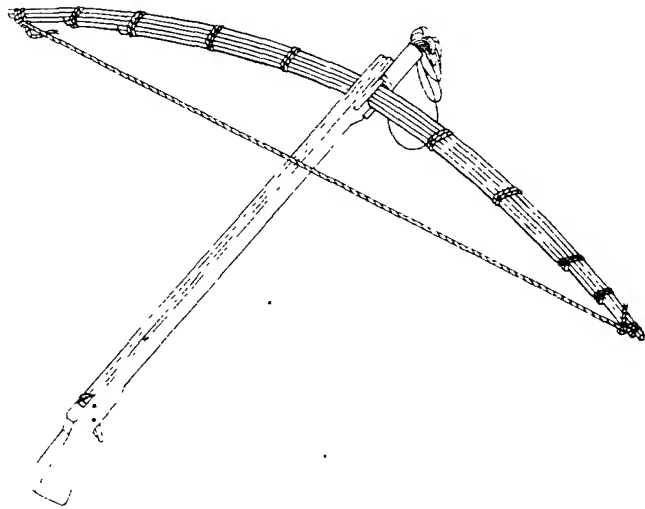


FIG. 2.—THE ORDINARY FORM OF MALAYALI CROSSBOW. FROM VALAPAD, SOUTH MALABAR. NOTE THE LONG STOCK AND SHORT, COARSELY-MADE BOW, THE LATTER FORMED OF FOUR PLATES OR LEAVES BOUND TOGETHER. THE ARROW GROOVE AND LINE HOLDER ARE BOTH SHOWN, BUT NOT THE ARROW.

Reference to the accompanying figures will facilitate description. As will be seen, the bow is compound, being made up of several thin wooden "leaves," varying from two to four in number, arranged in the same way as the separate plates or leaves in a carriage spring (Figs. 1 and 2). In some instances these are beautifully fashioned and fit together perfectly: in others they are coarsely made and rudely put together. At intervals in each bow the component plates are secured in position by encircling bands of coir yarn (sinnet).

Fig. 3 illustrates the three usual varieties of construction. In A only two component leaves are employed, but as these are considerably longer proportionately than in the case of bows made up of four components (compare Figs. 1 and 2), the two-leaved bow is the more slender and elegant in appearance. In the variety lettered B the bow is composed of four leaves, whereof the two inner ones are shorter than the outer ones and are neatly tapered off towards the ends to fit with precision within the outer enclosing members. This gives a perfection of elasticity to the bow not found in any of the others and at the same time ensures such a power of rebound when the bowstring is released as to make it a most effective and penetrative shooting weapon.

The third form, C, is a coarse variety having as its merits simplicity of design and low cost of construction. It is, however, a perfectly serviceable weapon and little inferior in practised hands to the more elegant and carefully-made varieties.

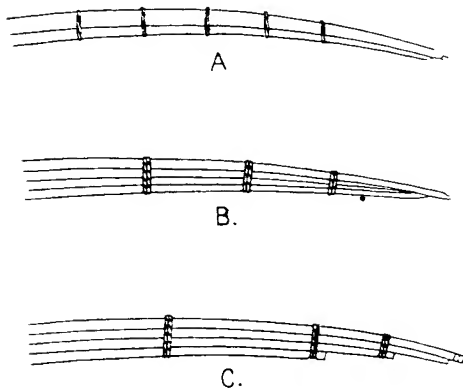


FIG. 3.—OUTER ENDS OF THREE VARIETIES OF THE "LEAFED" BOW OF THE MALAYALI CROSSBOW. IN A TWO LEAVES ARE EMPLOYED. IN B AND C FOUR; IN B THE TWO MIDDLE LEAVES ARE TAPERED OFF AND SHORTER THAN THE OUTER ONES.

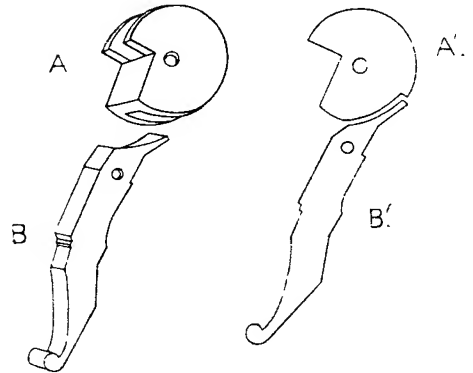


FIG. 4.—DETAILS OF THE TRIGGER (B AND B') AND WHEEL-NUT (A AND A'). THE FIGURES TO THE LEFT SHOW THE PARTS IN PERSPECTIVE, THOSE AT THE RIGHT BEING SEEN IN SECTION.

The stock also varies considerably in detail, and, in the best made, the butt end is obviously a more or less close imitation of that of a musket or rifle. The distal portion, some few inches from its termination, is perforated horizontally by a rectangular hole, through which the bow is passed half-way and then secured in position by means of thin wooden wedges. Along the whole extent of the stock anterior to the release mechanism runs a shallow longitudinal arrow-groove, wherein the arrow rests prior to discharge. The bowstring is usually coarse and clumsy, consisting of a stout cord made of coco-nut fibre.

The release is notable. As seen in Fig. 4, the details are identical with those of the typical European crossbow of the fifteenth and sixteenth centuries. It consists of a freely-revolving wheel-shaped "nut" (A and A') having a deep right-angled

notch cut in one side to hold the bowstring, and a shallow slot catch at a point on the opposite side of the periphery to take the inner end of the trigger lever (B and B'). When the bowstring is to be set, the trigger point is engaged beneath in the slot catch of the wheel-release, and then the string, being drawn back, is slipped over the forward edge of the notch on the opposite or upper side of this revolving device. The bow is now set: to release the bowstring, the free end of the trigger is pressed upwards towards the stock, thereby forcing the engaged end downwards and out of the check slot, so permitting the wheel-nut to revolve and free the bowstring, which then strikes violently the butt end of the arrow shaft lying within the arrow groove.

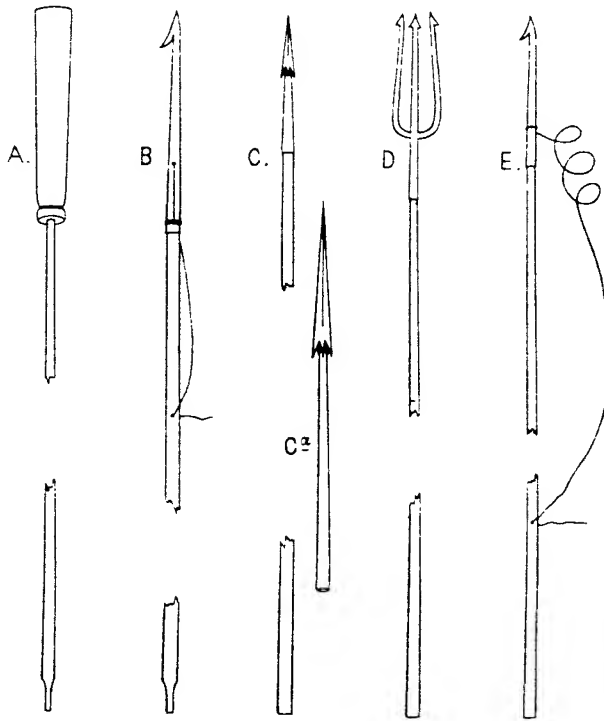


FIG. 5.—VARIETIES OF CROSSBOW ARROWS USED IN S. INDIA. A IS A BIRD BOLT, B AND E THE FORMS OF FISH ARROW IN GENERAL USE, C AND D BEING RARER VARIETIES OF THE SAME.

The arrows used vary considerably, but generally are of harpoon form. The most common is that where a barbed steel head is socketed at the base to fit the pointed end of a light wooden shaft. One end of a long line is tied to the steel head and thence passes through a hole in the wooden shaft to an open-ended cylindrical receptacle made from a bamboo joint, fitted upon one side of the bow close to the place where it passes through the stock (Fig. 2). In this receptacle the slack of the harpoon line is neatly coiled, ready to pay out when the arrow is released, so that it may be retrieved easily. Other forms are shown in Fig. 5: C and D are somewhat

uncommon, and I have not been able to secure examples of them: the sketches given have, however, been drawn by my assistant, Mr. K. R. Samuel (to whom I am indebted for all these crossbow figures), from specimens actually in use near his home in North Travancore. Example A, which has a blunt wooden head, is exceptional in being the only one used in shooting birds. It is, however, very seldom that the South Indian crossbow is so employed, its use in ordinary practice being restricted to the shooting of fish. In this curious pursuit the Malayali users of the crossbow are often extremely expert, and withal patient; they will wait for hours to get a shot at a fish. They seldom miss, and, when they hit, the arrow not infrequently transfixes the body of the fish, so powerful is the force of the discharge.

The dimensions of a typical Malabar crossbow are as follow¹ :—

	cm.
Length of stock overall	88
Length from distal end to trigger	62·4
Thickness of stock at mid-length	2·8
Length of bow along the chord of its arc when unstrung...	143·0
Length of arrow	76·3

So far as I am aware, the only other form of crossbow in present-day use in any part of the Indian area is a small and rudely-fashioned type found among the Kachins.² In details of its design it is wholly unrelated to that of Malabar, the release being of that simple form wherein the trigger directly pushes the bowstring out of a transverse groove cut in the upper surface of the stock. The bamboo arrow used is also different, being feathered at the butt and with the end simply pointed and without any sort of barbing. It is employed solely for shooting birds and small game.

Apart from this, there can be no doubt that the Malabar form of crossbow is not indigenous. Two considerations suffice to prove this: the first is the deduction to be drawn from the vernacular name by which it is universally known in Malabar, and the second is the character of the release. The former is *parangi pathi*³: as is well known, *parangi* is the South Indian (Tamil and Malayali) corruption of *fringhi*

¹ From a specimen deposited in the Pitt-Rivers Museum, Oxford.

² [The crossbow is used also by Karens of Pegu as well as by Kachins throughout Upper Burma: by many Naga tribes (Lhota, Chang, Sangtam, Kalvo-kengyu, Naked Rengma and Sema); by the Miris of Sadiya, and by the Abois and others to the north of the Brahmaputra.—H. Balfour.]

³ The use of the term *parangi pathi* is limited to Malabar and the northern part of Cochin State. In Southern Cochin and in Travancore the crossbow is known only as *thettali*. I am informed by a Malayali friend that *pathi* signifies a groove: in such case the Travancore term is practically synonymous, as *thettali* is said to mean "hit" or "fired from a groove," an expression which adequately defines the action of the weapon. Curiously enough, according to Grundert's Malayalam dictionary, "foot-soldier" is given as the meaning of *pathi* (*paththi*). *Parangi pathi* or *paththi* would therefore be equivalent to "Portuguese soldier," a term that may possibly have been applied by the Malayalis to the crossbow as peculiarly distinctive of the Portuguese soldiery. Grundert does not give "groove" as an equivalent of any word resembling *pathi* or *patti*.

(which in turn was a corruption of "Frank"), and became later the Indian term for all *western* Europeans. In South India, the Portuguese being the earliest Europeans with whom in modern times the inhabitants came into intimate contact, the term *portugi* has come to be accepted as the virtual equivalent of "Portuguese," hence the local term definitely associates the Portuguese with this weapon: the inference is clear that its general form was borrowed from this source.

The identity of the release with a common European type has already been stated, so we arrive at the definite conclusion that the South Indian cross-bows, in common with those of West Africa,¹ are undoubtedly of European origin: in the present case there can be no doubt that the model imitated was a Portuguese one.

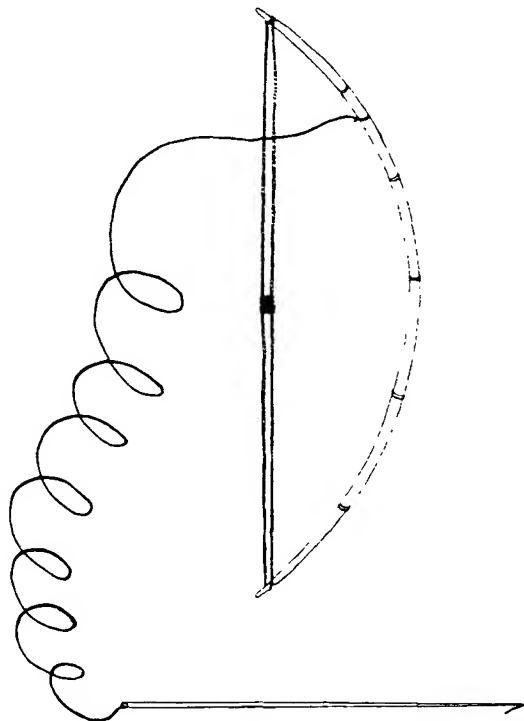


FIG. 6.—A "PELLET-BOW" ADAPTED FOR SHOOTING FISH WITH A BARBED ARROW, MALABAR.

The Malayalis would be the more ready to adapt this weapon to the shooting of fish, as they had already adapted an even more unusual weapon—the blow-gun—to the same purpose. Both continue to exist side by side with use restricted to the same end—the shooting of fish—a fact without parallel in any other part of the world.

It is also highly probable that the common pellet or stone bow of twin strings was in general use in Malabar for shooting fish prior to the adoption and adaptation of the more powerful crossbow type for this purpose. It appears, indeed, still to linger on, for I saw a specimen of such a pellet bow (Fig. 6) some years ago from the

¹ Balfour, H., "The Origin of West African Crossbows," *Annual Rep. Smithsonian Institution for 1910*, Washington, 1911.

Malabar region : it must be rare and of very restricted local use, for I have never been able to secure a second specimen. In the case of the example seen some years ago, and from which the sketch here reproduced was made, a long and thin cord was attached at one end to the bow as shown, the other being tied to the butt of the arrow used. The arrow head was of iron and single barbed, as is usual in the case of the harpoon arrows shot from crossbows. Unfortunately, the specimen figured is now missing.

DESCRIPTION OF TEXT-FIGURE. p. 337.

A and B.—Outlines of two ceremonial electrum boomerangs found in the tomb of Tut-ankh-Amen, near Luxor, from photographic reproductions in *The Times*. Both are highly ornamented over the whole surface (here omitted), and on A an *uchat* eye appears.

C to F.—Four South Indian wooden boomerangs actually used in hunting. For description see text.

G and H.—Two wooden boomerangs, probably of ceremonial significance, from South India. In the Madras Museum. In H, the distal end is ornamented with metal work.

I.—A ceremonial iron (or steel) South Indian boomerang in the Madras Museum.

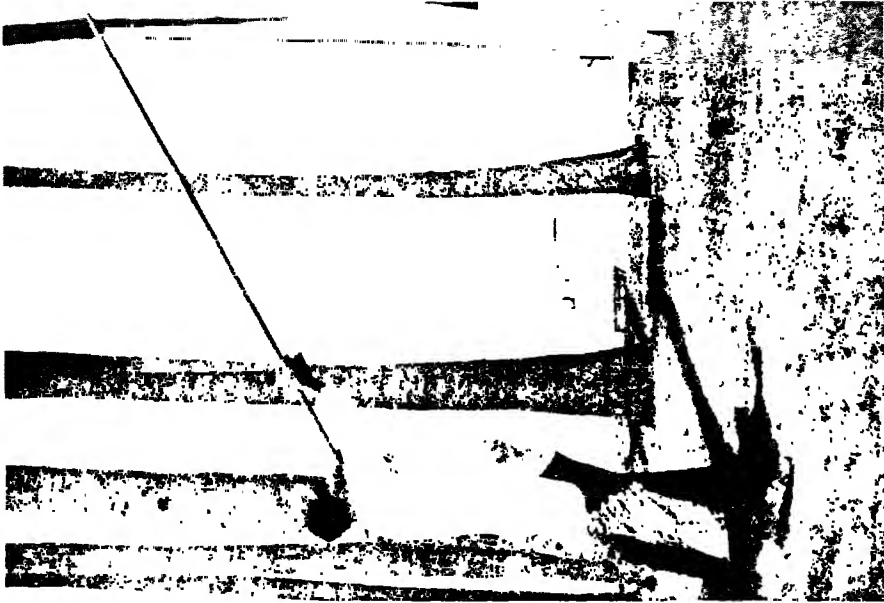


FIG. 2. A THERIPARAKI LABRAI TAKING AIM. IN THIS CASE THE GUN IS HELD IN A DIFFERENT MANNER—THE ONE GENERALLY ADOPTED AT THIS PLACE AND AT KILAKARAI.



FIG. 1. A LABRAI MUHAMMADAN USING THE PELLET BLOW-GUN AT TONDI, PAKK BAY. THIS SHOWS THE ORTHODOX METHOD OF HOLDING THE BARREL.

SOUTH INDIAN BLOW-GUNS.

THE ORIGIN OF STENCILLING IN THE FIJI ISLANDS.

By HENRY BALFOUR, M.A., F.R.S.

[WITH PLATES XXXVI AND XXXVII.]

THE Rev. Thomas Williams, in his description¹ of the manufacture of bark-cloth, *masi*, in the Fiji Islands, gives some details as to the processes of decorating the "cloth." After describing the method of patterning the central portions of large squares of *masi*, by a process identical with that of "taking a rubbing," and by the painting of lines and dots with a brush, he goes on to say (p. 66). "Blank borders, two or three feet wide, are still left on two sides of the square; and to elaborate the ornamentation of these, so as to excite applause, is the pride of every Fijian lady. There is now an entire change of apparatus. The operator works on a plain board: the red dye gives place to a jet black: her pattern is now formed by a strip of banana leaf placed on the upper surface of the cloth. Out of the leaf is cut the pattern—not more than an inch long—which she wishes to print upon the border, and holds by her first and middle finger, pressing it down with the thumb. Then, taking a soft pad of cloth steeped in the dye in her right hand, she rubs it firmly over the stencil, and a fair, sharp figure is made. The practised fingers of the women move quickly, but it is, after all, a tedious process."

J. W. Anderson² gives the following brief description of stencilling patterns on bark-cloth:—"The patterns—tinselled on them by cutting out of a banana leaf the shape of the portion intended to be painted, and then by placing the leaf above the cloth and brushing over it so that the colour will affect only the part of the cloth uncovered—are very curious, and conspicuous for the absence of any curved lines in the design. The colours employed are black and brown."

Miss C. F. Gordon Cumming also describes³ this process from personal observation in 1876, as follows:—"Then the borders are very elaborately painted by a sort of stencil-work, the pattern being cut out of a banana leaf, heated over the fire, and laid on the *masi*. Then, with a soft pad of cloth, dipped either in vegetable charcoal and water, or red earth liquefied with the sap of the candle-nut tree, or any other dye that takes her fancy, the artist does her work with deft, neat fingers."

Now, the process of repeating designs by means of *stencils* is, to say the least, one which is very rarely met with among peoples in a backward state of culture.

¹ *Fiji and the Fijians*, 1860, I. p. 65.

² *Notes of Travel in Fiji and New Caledonia*, 1880, p. 98.

³ *At Home in Fiji*, 1882, p. 162.

At the moment, in fact, I can think of no parallel instance to that recorded from the Fiji Islands, and it becomes of interest to consider the possible origin of this local method of transferring patterns with accuracy by rubbing colouring-matter through perforations cut in leaf stencil-plates. Either the process is indigenous and was invented by the stone-age Fijians themselves, or it must have been introduced from the outside.

This art-technique does not appear to have been practised by any other native peoples occupying the islands of the South Pacific, even by the Tongans and Samoans, the near neighbours of the Fijians. Nor can I find any evidence pointing to the stencilling process having been introduced into the group by immigrants of higher culture—traders, colonists or missionaries. Since the discovery of the Fijian group by Abel Tasman, in 1643, until early in last century, indeed, these islands, with their dangerous fringing-reefs and their warlike and truculent inhabitants, were hardly visited at all. The early white settlers, when they *did* arrive, were mostly escaped convicts and desperadoes who maintained a precarious existence among the natives, and who were, for the most part, by nature very unlikely to influence the æsthetic practices of the Fijians, which had already reached a high standard. The first regular settlement of European traders was established at Levuka about the year 1835, and late in that year the first white missionaries (Cross and Cargill) reached Lakemba Island and, under considerable difficulties, founded a mission-station there.

Thomas Williams himself landed on Lakemba in 1840, and from the account which he gives of the stencilling process (quoted above) we may, I think, fairly assume that he regarded it as indigenous and old-established. Had the technique been taught to the natives by his missionary predecessors, he would have known and would assuredly have so stated.

If there seems little reason for believing that the art of stencilling was introduced into the Fiji Islands in recent times by immigrants, there still remains the possibility that the ancestors of these Melanesians may have brought the idea with them during the great migration which eventually led to their peopling the group, and that their ancestors may have already learnt the art before they had quitted the Asiatic mainland, or have acquired it *en route*. This, however, does not appear probable, since, were this technique an heritage from the early days of Melanesian dispersal, one would expect to find traces of it among other offshoots from the common stock: and there is difficulty in accounting for the apparent fact that the Fijians stand alone (among Melanesians and Polynesians) as stencillers.

In view of the lack of evidence pointing to the technique having been borrowed by the Fijians from others, it is desirable to consider whether, possibly, it may be of strictly *indigenous* origin; whether, that is, the source of inspiration may have been discovered locally, and this unusual process of decorating bark-cloth may have been independently invented by Fijians. The plausibility of *this* solution was suggested to my mind during the autumn of 1922, while I was making an ethnological tour

through the Naga Hills of Eastern Assam. My attention was arrested by some fallen bamboo leaves, which exhibited curious perforations disposed in regular linear series across the width of the leaves, the rows of holes, or elongated slots, often extending from margin to margin (Pl. XXXVI). I subsequently found that this peculiar alignment of perforations is not only very commonly to be noticed on leaves of the bamboo,¹ both growing and fallen, but also occurs on leaves of several other plants, *e.g.*, Banana, Canna, Ekra-grass, etc. These alignments of holes or slots are the work of the larvæ of certain insects (? Longicorn beetles). When the sprouting leaf of the bamboo is quite young it is very tightly rolled up,² and the larvæ gnaw into them, boring a miniature tunnel transversely half-way through the leaf-whorl until the centre of the roll is reached.³ The tunnel, so formed, may be very small and nearly cylindrical, or it may be elliptical and often considerably elongated, the long axis always lying along and not across the leaf. The shape of the tunnel may even approximate to the rectangular, since the extremities of the bore are sometimes almost squared. Now and then one finds examples in which the holes are decidedly irregular and unsymmetrical (Pl. XXXVI, Nos. 31-35).

When the young leaf unrolls itself in due course and opens out into its mature, flat, light-absorbing state, the sometime "tunnel" appears as an alignment of nearly uniform holes or slots (which may be circular (Pl. XXXVI, Nos. 1 and 2), elliptical (Nos. 6, 7, 8), elongated (Nos. 10, 11, 12, 20, 21, 22), sub-rectangular (Nos. 14-18), etc.) running across the leaf. Their edges exhibit minute serrations caused by the mandibular action of the larvæ. I have found many instances of two or three tunnel-having been bored through the same leaf, which, when it expands, exhibits two or more parallel transverse rows of holes (Nos. 23-29, 34 and 35). It will be noticed that the perforations caused by insect-larvæ are graduated in size from one edge of the leaf to the other, and also that the interspaces between them become progressively narrower as the holes become smaller. This is due to the leaf-lamina having been very tightly rolled up, the inner whorls being, of course, far more closely rolled than the outer.⁴ It is evident, from the fact that the perforations are graduated in some cases from right to left and in others from left to right, that the convolution may be either sinistral or dextral, and I would gather from examination of a large number of leaves that the two types of convolution exist in approximately equal numbers. The graduated size and spacing of the perforations, coupled with the fact that, where the holes do not extend right across the leaf, the larger holes are close to one of the leaf-margins, while the diminishing series often dies out half-way across the leaf (or well before the other margin is reached), seems to show that the larva commences

¹ I use the term "bamboo" in a generalized sense, as I have not been able to determine whether the genus was *Bambusa*, *Arundinaria* or *Phyllostachys*.

² The leaf-lamina is "convolute" prior to opening out.

³ I found no instance of the boring having been extended completely through the whorl: it always, apparently, ceases at or near the centre, *i.e.*, halfway through the roll.

⁴ The transverse section of a leaf-roll would resemble a watch-spring.

to bore into the whorl from the outside and drives its tunnel towards the centre, which is not always reached, and that the boring is not from the centre outwards.

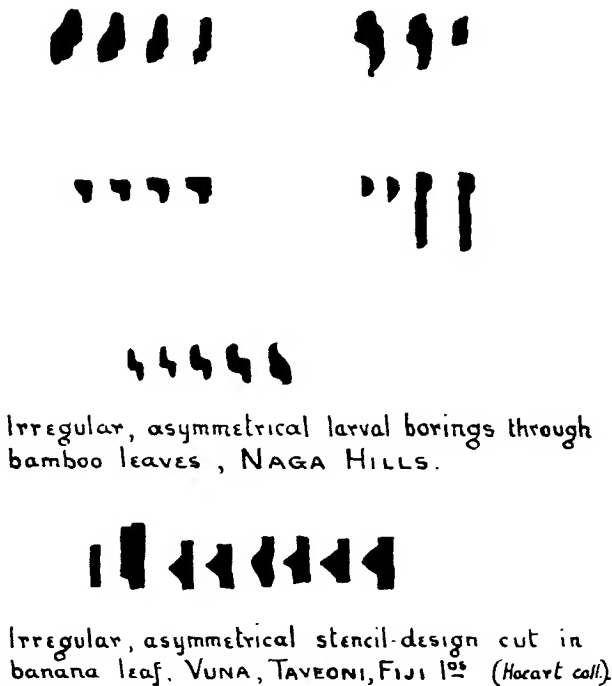
Such leaves with their remarkable linear series of perforations are, practically, Nature-made stencil-plates, awaiting an observant eye to appreciate their potentialities as pattern-producing agents. The rhythmic sequence of slots catches the eye at once, and at first suggests an effect artificially produced by human agency. The Nagas have not adopted this Nature-offered stencil for use: but some of these keen students of Nature understand clearly how the effect is arrived at. Ngaku, a very intelligent Chang Naga, when consulted about it, explained exactly how boring larvæ drive their tunnels into the rolled-up leaf. The boring of leaves by larvæ in the manner described, and the resultant regular linear pattern of slots, is, of course, well known to botanists and foresters, and appears to be very widely spread over the tropical and sub-tropical world.

May not the Fijians have discovered for themselves (at first, no doubt, accidentally) that pigment rubbed over the surface of such leaves would be transmitted through the perforations to any underlying surface? The form and arrangement of the slots would be faithfully reproduced, forming a pleasing pattern. Once the decorative potentiality of this simple process was appreciated, and it was found that a natural pattern could thus not only be reproduced upon their *masi*, but could be repeated over and over again from the same leaf with unfailing regularity and fair speed, it would have involved but a small step forward to imitate the natural stencil-plates by cutting out similar patterns on leaves, with even greater regularity of outline and spacing (Pl. XXXVII, Figs. 1 and 2). When the open work designs came to be cut artificially and leaf stencil-plates were *manufactured*, there would arise a tendency to vary and improve upon the patterns, and by a gradual process of variation from the prototypes, the more complex designs seen upon some Fijian stencils would easily have been evolved (Pl. XXXVII, Fig. 3). Man has very frequently derived his first suggestions from Nature, whose forms he has adopted, then imitated, and subsequently elaborated until the metamorphosis is complete and a seemingly entire emancipation from Nature's restrictions has been arrived at.¹

In putting forward tentatively this theory of the possible origin of the Fijian stencils, I would emphasize the following points:—(1) It is significant that, with few exceptions where in recent times paper has been used, the Fijian stencils are, apparently, invariably made from *leaves*, particularly those of the banana or plantain, one of the kinds of leaves which are commonly attacked by boring larvæ in the manner described. I have found many examples of banana leaves exhibiting the resultant transverse alignment of slots. (2) Other plants liable to similar larval tunnelling, *e.g.*, the bamboos and Canna, occur also in the Fiji Islands, so that there is abundant material available, provided that the larvæ possessing this leaf-boring propensity

¹ Cf. *Evolution of Decorative Art*, by Henry Balfour, 1893, pp. 17–31.

are also present.¹ (3) The simpler Fijian stencil-patterns often bear a striking resemblance to the alignments of slots caused by tunnelling larvæ (Pl. XXXVII. Figs. 1 and 2). The prevailing squaring of the ends of the artificially-cut slots has its possible prototype in some of the larval borings, which exhibit a decided tendency towards rectangularity of outline (Pl. XXXVI. Nos. 14–17). Certain irregular, asymmetrical slots cut in Fijian stencils suggest derivation from very similar asymmetrical borings which may be seen upon many of the larva-bored leaves (Text-figure 1). (4) The slots of the artificial stencils are aligned transversely *across* the leaves, and never, as far as I



TEXT-FIG. 1.—FIVE SERIES OF IRREGULAR LARVAL BORINGS THROUGH BAMBOO LEAVES, NAGA HILLS, AND AN IRREGULAR ASYMMETRICAL STENCIL-DESIGN, CUT IN BANANA LEAF, FROM THE FIJI ISLANDS. (THIS IS SHOWN IN ONE OF THE SPECIMENS REPRODUCED IN PL. XXXVII. FIG. 2.)

have seen, *along* them, though in some of the more specialized designs the alignment is more or less diagonal (Pl. XXXVII. Fig. 3). All of the many hundreds of insect-perforated leaves which I examined exhibited a transverse disposal of the lines of slots. (5) I have so far found no evidence which suggests the introduction of the art of stencilling into the Fijian group from the outside.

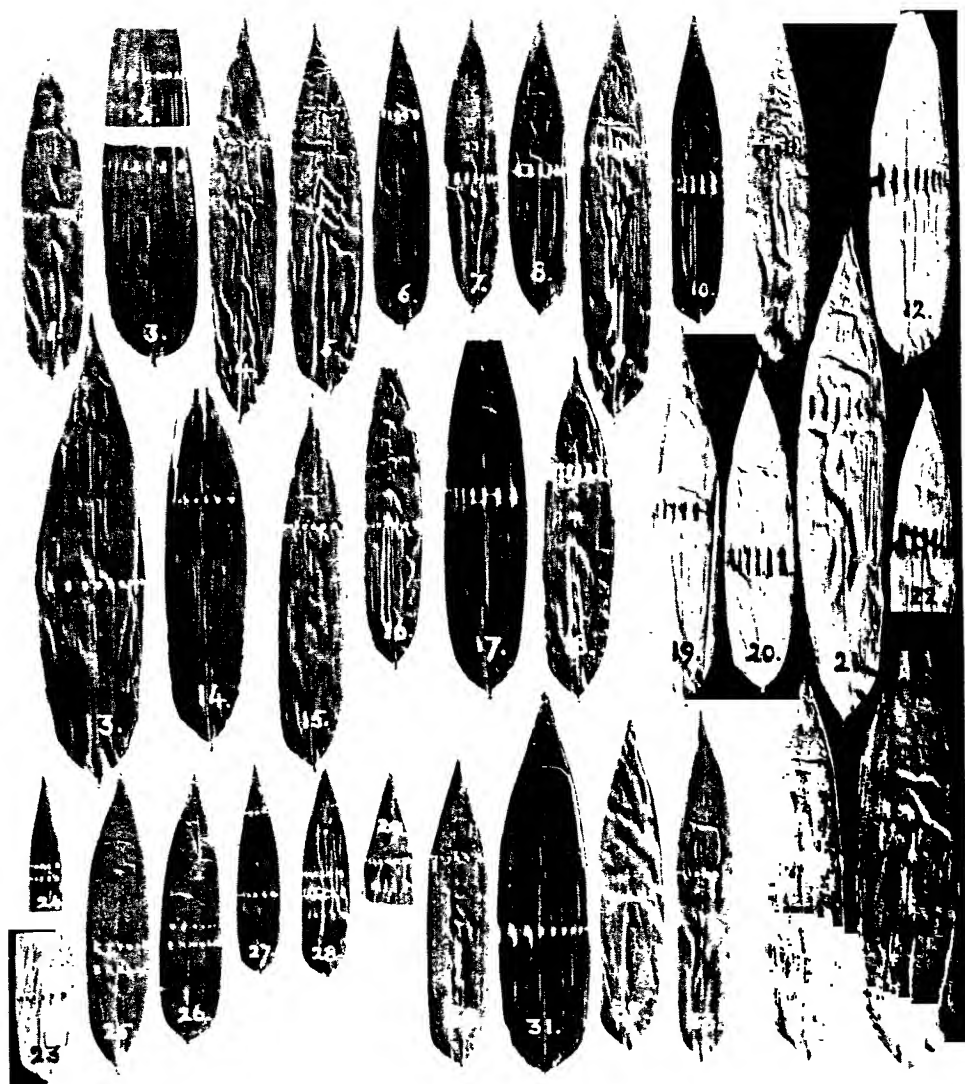
¹ I have not at present been able to verify this; but the very wide tropical dispersal of insect-larvæ having this habit renders it highly probable that they occur in this group of islands.

If I am justified in urging the probability of this technique having been arrived at by the Fijians through acceptance of an idea suggested to them directly by Nature, a good instance is afforded of the independent discovery by an isolated people of a process employed by other distant peoples (in Asia and Europe) who themselves, for aught we know, may also have derived their inspiration from Nature. In view of the very wide dispersal of natural potential stencils, there seems to be no valid reason why the artificial process, which may so easily have been Nature-suggested, may not have had a plurality of origins.

I would further suggest that two other unusual methods applied to the decoration of bark-cloth in the South Pacific, methods which, like stencilling, are peculiar to certain restricted groups of islands, may very probably be regarded as having been independently invented by the natives. These are (1) Nature-printing from fern-fronds, as practised in the Society Islands,¹ and (2) patterning by the process of "taking a rubbing" as performed in the Fijian and Samoan groups.

I desire to thank Miss E. R. Saunders and Dr. G. C. Druce for their kind advice upon certain botanical points referred to. The Fijian stencils were collected by Mr. A. M. Hocart, and are now in the Pitt-Rivers Museum, Oxford.

¹ Specimens exhibiting this technique were collected in Tahiti during the cruise of the "Endeavour" under Captain Cook, 1768-71. Two of these are in Dr. William T. Brigham's collection.



THIRTY-FIVE SPECIMENS OF BAMBOO LEAVES EXHIBITING TRANSVERSE ALIGNMENTS OF PERFORATIONS CAUSED BY BORING LARVA, NAGA HILLS.

THE ORIGIN OF STENCILLING IN THE FIJI ISLANDS.



FIG. 1.

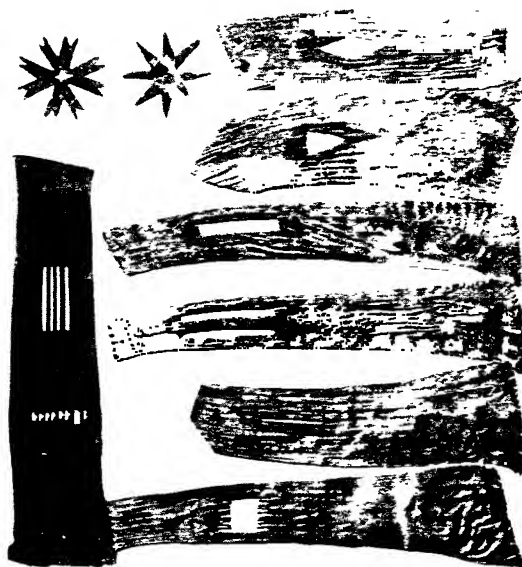


FIG. 2.

FIJIAN ARTIFICIAL STENCILS, CUT IN BANANA LEAVES: SIMPLE DESIGNS.
(THE TWO STELLATE EXAMPLES ARE CUT FROM PAPER)



FIG. 3.

SIMILAR STENCILS EXHIBITING MORE ELABORATE
DESIGNS.

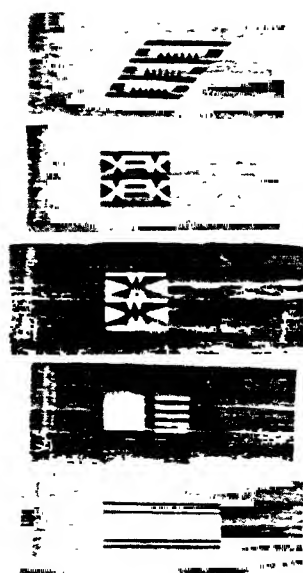


FIG. 4.

FIJIAN STENCILS CUT IN PALM-LEAF.

THE ORIGIN OF STENCILLING IN THE FIJI ISLANDS.

THE AGE OF THE MAYA CALENDAR.

By RICHARD C. E. LONG, B.A.

IN *Man*, 1918, 70, I made a suggestion as to the Long Count of the Maya having been arrived at by calculating back to obtain a date which would be the commencement of a period harmonizing lesser periods. That suggestion would not fix the date of invention of the Long Count more nearly than what was already known, namely, that it must have been invented prior to the date of the Tuxtla Statuette, which is 8-6-2-4-17 8 Caban 0 Kankin, 20th July, 368 B.C., and it would require that the calendar round of 52 years, with its shifting year of 365 days, had already been long in use. Only after a lengthy familiarity with the accurate time measurement afforded by the calendar round could the Maya have advanced sufficiently in calendrical science to make the calculations resulting in the invention of the Long Count.

The problem to be attacked in the present paper is to determine not the date of the adoption of the Long Count, but the approximate date of the far earlier adoption of the unchangeable year of 365 days. All dates in the Christian reckoning are given here according to the Julian calendar, and as the Maya year was a shifting one, any given month day, such as 8 Cumhu, would every four years fall a day earlier in the Julian calendar, and after 1461 Maya years, or 1460 Julian years, it would have shifted through one whole year and the two calendars would again coincide. It follows that if the exact day was known in the Julian year which corresponded to such a Maya month day at the time when the year was first fixed in its unchangeable form it would be possible, by calculating the shift of the calendar, to determine that the year was so fixed in any one of certain Julian years separated from each other by 1460 years. Similarly, if only the approximate day of the Julian calendar was known, then the date of fixing the year could be limited to certain groups of Julian years.

Now, according to Landa, in his time 8 Cumhu fell on 28th June, and on the Bowditch correlation the same would have occurred before that at 9-8-9-11-10 4 Oc 8 Cumhu, 28th June, 74 A.D., as a complete shift had occurred in the meantime. It is a strange coincidence, but apparently nothing more, that this shows that the date on the Palace Steps at Palenque, 9-8-9-13-0 8 Ahau 13 Pop, 28th July, 74 A.D., fell at a time when the calendar of the Old Empire coincided with that given by

Landa in its relation to the Julian year. A more important result is that throughout Cycle 9 the calendar did not greatly differ from that in Landa's time in its relation to the seasons, which confirms the view long ago expressed by Förstemann. Thus, at the beginning of Cycle 9, the date 8 Cumhu corresponded to 9th August, and at the end of the cycle to 2nd May. If we follow the rotation of the shifting calendar backward in time, we reach the earliest contemporaneous date, that of the Tuxtla Statuette, at which epoch 8 Cumhu corresponded to 18th October. Further back than this we cannot trace it directly, since all the earlier dates are mythical or traditional and are not in themselves evidence that the calendar was then in use. Calculation shows that 4 Ahau 8 Cumhu, the mythical zero point of the Long Count, would fall on 13th January, 3642 B.C., and therefore the beginnings of the months would at that date be as in the following table :—

TABLE I.

0 Pop ...	30th January.	0 Yaxkin...	30th May.	0 Mac ...	27th September.
0 Co ...	19th February.	0 Mol ...	19th June.	0 Kankin...	17th October.
0 Zip ...	11th March.	0 Chen ...	9th July.	0 Muan ...	6th November.
0 Zodz ...	31st March.	0 Yax ...	29th July.	0 Pax ...	26th November.
0 Tzec ...	20th April.	0 Zac ...	18th August.	0 Kayab ...	16th December.
0 Xul ...	10th May.	0 Ceh ...	7th September.	0 Cumhu...	5th January.
				0 Uayeb ...	25th January.

Now the instances of calculations to rectify the calendar collected by Bowditch, in the inscriptions, all show an intention to make the corrected calendar agree with what it was at the zero point of the Long Count, and the same result follows from a paper of mine in this *Journal* (vol. liii. pp. 36-41). It would appear, then, that the ideal calendar with which the Maya endeavoured to make the shifting calendar coincide by their corrections was as in the above table. But since the zero point of the Long Count was itself only obtained by calculations made very long afterwards, it might be argued that these corrections were also the result of later speculations so as to make the calendar conform to what it would have been at the mythical starting point. I do not, however, think that this was so. No doubt the Maya month names and the glyphs denoting them were appropriate to the seasons in which they originally fell, as in the case of the month names of other peoples, and likewise the ceremonies of each month were also appropriate to its season. It would not do to have a harvest festival at sowing time, or *vice versâ*. The month names and glyphs were surely far older than the calendar round and the unchanging year of 365 days. Until the latter was fixed there would be no practical difficulty, as the monthly festivals would be empirically regulated, as among many primitive races, either by the state of the crops or by the stars or sun. But when the shifting year came into use there would arise the need of corrective calculations to keep the festivals right with the seasons, and the point I wish to make is that as the corrections show that

the true beginnings of the months were supposed to fall at the same times in the natural year as in the above table, it follows that these were the actual times of year at which the months began when the year was first made unchanging in length, and therefore shifting.

But there is another line of evidence which leads to the same conclusion. It is well known that the same glyph, commonly called the Cauac element, enters into the composition of the glyph for the day-sign Cauac, of the rare "winged Cauac" variant of the tun glyph, of the normal cycle glyph (in this case doubled), and of the month glyphs for Chen, Yax, Zac and Ceh, and according to Seler (*Bulletin 28 of Bureau of American Ethnology*, p. 53), when it occurs on pictures of objects in the Codices it means that they are made of stone. I believe that a simple explanation will cover all of these uses, which are at first sight so different. The meaning of the word Cauac is unknown, but this day-sign corresponds to the Aztec day-sign Quiahuitl, "rain," and it was held by Seler (*op. cit.*, p. 52) that the Maya day-sign Cauac and the equivalent Zapotec one had also this meaning. The glyph itself confirms this, as probably the element in it resembling a bunch of grapes represents clouds, and the small cross sometimes found represents the winds which bring rain from the four cardinal points (T. A. Joyce, *Mexican Archaeology*, p. 249). But amongst many peoples the word "rain" is used for year, the years being reckoned by annual rains, as in the gesture language of the North American Indians, and this would explain its being used in the winged Cauac variant of the tun glyph. The tun of 360 days was an approximate year, the first approximation made by the Maya, and therefore had the meaning of "year" in a loose sense. Hence it could be used interchangeably with the Cauac glyph meaning "rain" in the sense of "year." The peculiar "wing" of the winged Cauac variant is equivalent to "kin," "sun" or "day," and may have been added in later times to distinguish it from the Cauac day-sign. The meaning of the Cauac glyph with this addition is probably either "days of rain" or "rain and sun," *etc.*, "the rainy and the dry season," "the whole year." The Lacandonos, a branch of the Maya, reckon time by dry and wet seasons at the present day. Now it is well established that the normal tun glyph means "stone," as the word tun itself does, and denotes the stone which was set up to mark the passage of each tun, so that when the two signs, the normal and the winged Cauac variant, had acquired the same meaning of "year," they could be used as equivalent to each other in the sense of "stone" and so denote any object made of stone. Before leaving the tun it may be noted that the face glyph for this period can be partly explained. This is characterized by a skeleton jaw, and the same skeleton jaw is used to distinguish most of the face numerals over ten. The face character for ten itself is a skull, and both this and the glyphs for the numerals over ten sometimes have the Cimi, "death," sign on them. All three—the fleshless jaw, the skull and the Cimi mark—are connected with death, but I have not seen any explanation of this. It would appear that the various death

signs have a meaning of "finished," and denote in the case of ten and the numbers above that one ten has been finished, and in the case of the tun that one tun has been finished. An exact parallel can be found in several of the Melanesian languages of New Guinea for this use of "dead" in a numerical sense, *e.g.*, in the Dobu language, which has a vigesimal numeral system. Here the expression for "five" is "hand is dead," meaning that the count of the fingers is finished, and the expression for "twenty" means "man is dead," meaning that the count of his fingers and toes is finished, an idea expressed in many other languages by "man is finished." Several other cases of this use of "dead" are given by Mr. S. H. Ray (*Report of the Cambridge Anthropological Expedition to Torres Straits*, vol. iii, p. 467). So, too, the use of the doubled Cauac glyph in the normal cycle glyph seems derived from its use as "year." As the Maya advanced in their calculations to higher numbers they may have devised this sign for a higher time period by doubling the sign already used for "year." We now come to the months Chen, Yax, Zac and Ceh, all of which have the Cauac glyph as their main part and are only distinguished from each other by their superfixes. Of these the superfix of Chen (the first of these four consecutive months) and of Ceh (the last) are respectively similar to the superfixes of the two consecutive months Uo and Zip, which also are only distinguished from each other by their superfixes, so it is probable that the superfixes of Chen and Uo have the meaning of beginning of a season, and that the superfixes of Ceh and Zip have the meaning of end of a season. The superfix of Yax, as has long ago been noticed, is the same as that of Yaxkin, and since the main element of the latter is the kin sign, the superfix must signify the syllable Yax. There is no clue to the meaning of the superfix of Zac. Now if the Cauac variant means "rain," it is a reasonable explanation that the glyphs for the four months Chen, Yax, Zac and Ceh mean "months of rain." Chen being marked as the beginning of them and Ceh as the last. In the above table these months cover the period from 9th July to 26th September (Julian). But according to Professor Morley (*The Inscriptions at Copan*, p. 2) the rainy season in the area occupied by the Old Empire lasts from the middle of May till the end of December, and is at its height in July. In his *Introduction to the Maya Hieroglyphs* he says the rainy season lasts from May or June till January or February. These statements of course refer to dates in the Gregorian calendar, but, unless the months were fixed at a very remote period B.C., this is immaterial, as the Julian calendar only diverges from the Gregorian at the rate of three days in four centuries. This agreement between the seasons and the table is a remarkable confirmation of the suggested explanation of the meaning of the month glyphs.

In the above-mentioned paper in this *Journal* I drew attention to the fact that the corrected beginning of the Maya year was at the beginning of February, and that the years of the Cakchiquel and of the Aztec began at the same time. This, again, entirely fits in with the other evidence, because it would make the beginning of the year occur at the beginning of the dry season, according to Morley, and it

would be natural that so important a point of the natural year should be made the commencement.

A further confirmation may be mentioned, though it has not the same weight as the others. It has long been noticed that the name of the month Xul means "end," and that of the following month Yaxkin may mean "first days" or "first sun." Kin means "day" or "sun" and Yax means "green," "fresh," "vigorous" and "first," and it has therefore been suggested that at some period the year ended with Xul. Now in the above table these months extend from 10th May to 16th June, and this would just cover the conjunction of the Pleiades in May. The importance of the Pleiades in marking the beginning of the year has been shown by Sir James Frazer (*The Golden Bough: Spirits of the Corn and the Wild*, vol. i), and Förstemann (*Bulletin* 28, p. 523) has noted the statement of Peter Martyr that the natives near Vera Cruz, in Mexico, began their year with the heliacal setting of the Pleiades, and he says a year beginning in May occurred in Chiapas (part of the Old Empire territory). This may explain the meanings of these two month names. The Maya may well have had a year beginning, for some purposes, with the setting (or rising) of the Pleiades concurrently with the year beginning in Pop at the beginning of the dry season. Yaxkin is explained by Dr. Tozzer (in Bowditch, *The Numeration Calendar Systems and Astronomical Knowledge of the Mayas*, p. 288) as possibly meaning "the rainy season," which would agree with the table, but in Tozzer's *Comparative Study of the Mayas and Lacandonas*, he states that the Lacandonas use Yaxkin, "first sun," for the dry season and Hahal for the rainy season. But as these people have no vestige of the ancient time reckoning, and apparently no other words for seasons at all, it may be taken that the meaning is in both cases "first days," meaning with the Lacandonas "of the dry season," but with the ancient Maya meaning "after the rising of the Pleiades." In any case the Lacandone usage applies it to a different time of year from that in Landa's calendar, where it falls in November. The suggestion may be hazarded that as the glyph for Mol, the month following Yaxkin, is different in character from any other month glyph, with its circle of dots, it may be intended to represent the Pleiades when again visible after conjunction. Mol means "things piled one on the other" (Bowditch, *loc. cit.*) and one of the Aztec names for the Pleiades means "heap" (miec).

So Muan, in Table I, falls in November, in the rainy season, and it means "clouded day with chance of occasional showers," and Cumhu is explained as "sound produced by the marsh lands cracking as they grow dry" (*ibid.*), which is quite consistent with its position in the table in January just at the end of the rainy season.

A digression is necessary before leaving the month names. The pair of months Uo and Zip and the quartette of months Chen, Yax, Zac and Ceh, are the only instances among the Maya month glyphs of signs having the same main element and differentiated by additions. The 18 Maya month names are all distinct from each other and show no such arrangement in pairs or quartettes as these glyphs do.

In the Aztec month names, reckoning Atlcaualco as the first month according to the usual enumeration, the 3rd and 4th months, Tozoztoutli and Uei Tozoztli, form a pair, and so do the 7th and the 8th months, Tecuilhuitontli and Uei Tecuilhuitl. In each case the first of these pairs is "the little" and the second is "the great." But in the Cakchiquel calendar this is carried much further. Taking Tacaxepua as the first month, then the 2nd and 3rd are Nabey Tumuzuz and Rucab Tumuzuz, the 6th and 7th are Nabey Mam and Rucab Mam, the 9th and 10th are Nabey Tok and Rucab Tok, and the 11th and 12th are Nabey Pach and Rucab Pach. Nabey means "first" and Rucab "second." Comparing these with the Maya, it is noteworthy that here also the 2nd and 3rd month glyphs, Uo and Zip, have the same main part and that the four months, Chen, Yax, Zac and Ceh, are the 9th, 10th, 11th and 12th, thus corresponding to the two pairs of duplicated months in the Cakchiquel list. The 2nd and 18th Aztec months, Tlacaxipeualiztli and Izealli, have names obviously the same as the 1st and 17th Cakchiquel ones, Tacaxepual and Itzcal Kih. None of the other month names resemble each other, and it seems evident that to compare the Aztec with the Cakchiquel, the former should be each shifted one place backward, so as to make the list begin with Tlacaxipeualiztli and end with Atlcaualco. Then the duplicated Aztec months would be the 2nd and 3rd, as with both the Maya and the Cakchiquel, and the 9th and 10th as with the Cakchiquel. Here the Maya list has no duplication, as the 6th month is Xul, "end," and the 7th is Yaxkin, "first days." The meanings of these names are noteworthy when compared with the Cakchiquel Mam, because the Maya of Yucatan had ceremonies in honour of the god Mam during Uayeb, *i.e.*, the end of the year (J. P. Perez, in Stephen's *Incidents of Travel in Yucatan*, vol. i, p. 437), so that in this, too, a connection appears. Now at the Spanish conquest, Pop, the first Maya month, began on 16th July, while Tacaxepual began on 1st February and Tlacaxipeualiztli on 22nd February. But it has been shown above that Pop originally began about the 30th January or 1st February. It appears, then, that the duplication of names and glyphs shows a real connection between the month names of these three peoples and that (making the above shift of one month in the Aztec list, which at present cannot be explained) the three lists correspond, the first of each corresponding to the first of the others, and so on, notwithstanding the different time of year at which Pop began in Landa's time. As I have shown in my former paper, the position of Pop given by Landa was that of the shifting calendar, while the corrections used for fixing the festivals made the corrected date of Pop about coincide with the Cakchiquel and Aztec calendars. Whether the latter two peoples had a rigid shifting calendar concurrently with a method of correction, like the Maya, or merely an empirical regulation of festivals to conform to the seasons, is not known.

Returning now from the foregoing digression, it may be assumed that Table I represents the position of the months when the year was first fixed at 365 days, and the next question is to find at what points in the Long Count the months occupy

such a position. The following are the first four dates in the Long Count at which the Maya year and the Julian coincide, as in Table I :—

The zero point	...	...	4 Ahau 8 Cumhu	...	...	13th January, 3642 B.C.
3-14-1-5-5-	...	...	9 Chucchan 8 Cumhu	...	...	13th January, 2182 B.C.
7-8-2-10-10	..	...	1 Oc 8 Cumhu	...	...	13th January, 722 B.C.
11-2-3-15-15	...	...	6 Men 8 Cumhu	...	...	13th January, 739 A.D.

It need hardly be said that, as we are dealing with times before the invention of the Long Count, the dates are given here in that count merely as a means of notation, just as they are given in years B.C. Now the last of these dates is obviously excluded, as it is later than the dates of the inscriptions, while the first two, namely, 3642 and 2182 B.C., are far too early. No remains or other evidence in any way justify the idea that the Maya culture had taken shape at so remote a period even as 2182 B.C. But with 7-8-2-10-10, 722 B.C., it is quite otherwise. Be it noted that at 8-6-2-4-17, 20th July, 368 B.C., the date of the Tuxtla Statuette, the Long Count system of dating appears complete in all its parts. The interval of 354 years seems just sufficient to allow for the advance in science necessary for the invention of the Long Count, and it is by no means too long nor does it imply a date which is improbably early on any other grounds. Without using any calendrical arguments, it is in accordance with the general probabilities that the Maya had fixed the 365-day year as long as this before the date of the Tuxtla Statuette.

It is possible that the inscriptions of Palenque show a reference to the date when the year was fixed. It is generally accepted, following Bowditch, that several of the inscriptions there refer to calculations made to rectify the calendar. Now Bowditch (*op. cit.*, p. 162) has noticed that three of the distance numbers on the Tablet of the Cross would, if added to the initial series, make a total of 7 7 9 15-19, though it is true that no definite connection can be made by these numbers, so that we cannot say that this total is the initial series value of any date in this inscription, and he has also noticed that the distance number 7-7-7-3-16 occurs on the Tablet of the Foliated Cross. This number cannot be connected with any date whatever. Though exact proof is therefore lacking, I think it is probable that each of these refers to the initial series value of some early date contemporaneous, or nearly so, with the fixing of the year at 365 days. If so they would be 7 7-7-3-16 5 Cib 9 Muan, 19th November, 705 B.C., and 7 7 9 15 19 6 Canac 17 Mol, 9th July, 709 B.C. These are so near to 722 B.C. that they might well be dates in the reign of some Maya Julius Cæsar who established the shifting year. The circumstance that the Long Count was not then invented would not have prevented a record of the dates being kept by the calendar round method and handed down to the times of the Palenque inscriptions. The Annals of Quauhtitlan preserve an unbroken record of Toltec history for over 900 years by means of calendar round dating alone.

The next question to be considered is what are the limits earlier and later than the year 722 B.C. which would be in accordance with the foregoing. Taking up first the evidence presented by the glyphs and names for the months, the following table shows the dates in the Julian calendar on which the important month days referred to above would fall (A), if they were 30 days earlier than in Table I. and (B) if 30 days later :—

TABLE II.

(A)			(B)		
0 Pop	...	31st December.	0 Pop ...	...	1st March.
0 Xul	...	10th April.	0 Xul ...	...	9th June.
19 Yaxkin	...	29th April.	19 Yaxkin	...	28th June.
0 Chen	...	9th June.	0 Chen...	...	8th August.
19 Ceh	...	27th August.	19 Ceh	...	26th October.

A displacement of 30 days in the year implies a displacement of 120 years in the dates on which the Maya and Julian years would coincide, so that (A) would require 602 B.C. as the date of fixing the year, and (B) would require 842 B.C. The date of 1st March is much too late for the commencement of the dry season, and 31st December is the extreme limit, in the other direction, but not so probable as 30th January. The dates 10th to 29th April and 9th to 28th June are respectively too early and too late to have any connection with the Pleiades. In the case of Chen to Ceh it is not easy to fix a limit, owing to the great length of the rainy season, but still the dates in Table I agree best with the statement that it is at its height in July. On the whole, then, this evidence by itself shows that the dates in Table I are correct. But on the evidence afforded by the corrections of the calendar the dates must have been as in Table I, or very near it, allowing for the difference between the Julian and Gregorian calendars. In 722 B.C. the 30th January, Julian, corresponded to the 24th January, Gregorian, a difference of only six days and requiring only 24 years difference in the year B.C. Or again, if we use Bowditch's formula for correcting the Maya calendar (25 days in 104 years), it differs by less than one day in a century from the Julian and would only make a difference of 28 years. Compared with the similar problem of the sothic period in Egypt, the latter provides a more definite means of measuring the shift of the calendar, owing to the fixed point of the rising of Sirius, but the Maya problem offers much fewer periods to choose from.

It appears, then, to be justifiable to conclude :—

- (1) That the Maya year of 365 days was brought into use in or about 722 B.C.
- (2) That this took place in the same general region as that occupied by the Old Empire cities, seeing that the seasons of the year were similar to those prevailing there.
- (3) That the Long Count was invented at a much later date, most probably about Cycle 8 (488 B.C.).

On purpose nothing has been said above as to the date of invention of the calendar round, because it is immaterial to the argument whether it came into use at the same time as the 365-day year or not, though obviously it could not have come into use before the latter, which is one of its factors. That question would depend on whether the tonalamatl was used when the 365-day year was fixed. One of the factors of the tonalamatl, namely, the series of 20 day-signs, must have been in use, as the months of 20 days are based on it, and there is some evidence that its other factor, the series of 13 day-numbers, was also, because Förstemann (*Bulletin* 28, p. 494) has pointed out several series in the Dresden Codex having 364 (or its factor 91) as factors, and has rightly concluded that this represents a year of 364 days, which superseded the tun as a more accurate approximation to the length of the year, but was itself superseded by the year of 365 days, a still closer and therefore necessarily a later approximation. But the 364-day year necessarily implies the use of its factor 13, and shows that the 13 day-numbers were prior to the year of 365 days. Granting this the calendar round would automatically come into existence as soon as the latter year was fixed.

As to the condition before the fixing of the year, it appears that the 20 day-signs formed an unchangeable series, just as in later times. A suggestion was made long ago by Mrs. Nuttall in her work, "The Fundamental Principles of Old and New World Civilizations" (vol. ii of the *Papers of the Peabody Museum*, Cambridge, Mass., U.S.A., 1901), referring to an earlier paper of hers of 1886—which latter I regret I have not seen—that the formation of the Mexican calendar system originated from fixed market days. I think this is the true explanation of the Maya day-signs, that they represent the days of a market month independent of the seasons, and were the first foundation on which later the towering structure of the Maya calendar was built. It was this origin which gave it its characteristic feature of continuous series of days repeated endlessly. It is generally accepted that the 13 day-numbers were later, and probably Perez's view that they represent a half lunation is the correct one. The number 13, in its use by the Maya, presents a remarkably close parallel to the number 7 in Europe and Western Asia. Both, as time divisions, seem connected with the lunation, and both have immense importance as sacred numbers, while neither is a radix of a numerical scale. Now when the market month of 20 day-signs was established it afforded a convenient means of reckoning in place of the lunar months used by all early peoples. The market months were sufficiently long to be distinguished by seasonal names, like lunar months, and at first, just as with the Mota lunar months described by Codrington (*The Melanesians*, p. 349), there might be no definite series of month names and no conception of a year at all, but several names might be applied to the same month, according to what was done in it, and the same name might be applied to different months. The next stage would be the more or less unconscious selection of 18 names for the 18 market months, which nearly make up the natural year, just as with other peoples 12 names have come into use for

the 12 lunations which nearly make up the year. Professor M. P. Nilsson (*Primitive Time Reckoning*) has excellently dealt with this question so far as relates to the evolution of a calendar based on lunar months, and his reasoning can be applied similarly to the evolution of the Maya calendar, based on market months. Doubtless, as with many peoples using lunar months, the Maya at first did not notice that there was a discrepancy between the 18 market months and the natural year, and when a given month came round too early in the season they may have thought they had forgotten, just as the Masai do in a similar case with the lunar month, thus unconsciously making an intercalation. It may be safely concluded that the tun began in this way and then possibly advanced to the conscious intercalation of a market month, similarly to the intercalation of a lunation in the developed luni-solar calendar. It is doubtful if they ever used the tun as a fixed year without intercalation. If they did it would have quickly made its inadequacy apparent and have led to the closer approximation provided first by the 364-day year and afterwards by the 365-day year.

If the theory advanced in this paper is sound, it has an importance greater than the elucidation of the Maya calendar. Professor Morley has pointed out the great importance of the correlation of the Long Count with Christian chronology as a means of dating other American cultures. But this theory would establish a date far earlier than the earliest contemporaneous date of the Long Count, and be of correspondingly greater value.

ADDENDA.

(1.) As the foregoing paper to some extent covers the same ground as Dr. H. J. Spinden's recently published work *The Reduction of Mayan Dates*, it is right to say that my paper was sent for publication in January, 1924, long before Dr. Spinden's book appeared.

(2.) On consideration, I think that the shift in the Aztec month list can be explained. The Aztec monthly festivals fell on the last day of each month, that is, on the 20th day, while the Maya had no 20th day of a month but began it with a zero day. Thus 1 to 19 Pop might coincide with 1 to 19 Tlacaxipeualiztli, but 0 Pop would coincide with 20 Atlacualco, and 0 Uo with 20 Tlacaxipeualiztli, causing an apparent, though not a real, shift in the months of the two peoples.

MISCELLANEA.

PROCEEDINGS OF THE ROYAL ANTHROPOLOGICAL INSTITUTE. 1924.

January 25th, 1924.

Annual General Meeting. (See p. 1.)

January 8th, 1924.

Ordinary Meeting at 50, Great Russell Street.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced :
Dr. R. C. C. Clay, Mrs. H. D. Hilton-Simpson, Mr. F. Morey, Mr. S. T. Moses and
Mrs. C. A. de Beauvoir Stocks.

The PRESIDENT expressed the regret of the Institute at the absence of
Mr. DE BARRI CRAWSHAY owing to his serious illness.

Mr. HAZZLEDINE WARREN kindly consented to read Mr. de Barri Crawshay's
papers on—1. "Eoliths found *in situ* at South Ash." 2. "Azilian-Tardenoisian
Flint Industry in Mesopotamia."

The first paper discussed by Sir EDWIN HARRISON and Mr. WARREN. The second
by Dr. RUSHTON PARKER and Mr. SCHWARTZ.

Mr. CURELLY, of Toronto, described how an Indian made an arrow-head.

Questions were asked by Mr. WARREN, Mr. MERIVALE, Mr. PARKYN, and
Miss DURHAM, to which Mr. CURELLY replied.

A hearty vote of thanks was accorded to Mr. WARREN for his kindness in reading
Mr. CRAWSHAY's papers, and the Institute adjourned till February 5th.

February 5th, 1924.

Ordinary meeting at 50, Great Russell Street.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. W. E. ARMSTRONG read his paper on "Rossel Island Money," illustrated
by lantern slides.

The paper was discussed by Mr. SCORESBY ROUTLEDGE, Dr. RUSHTON PARKER,
Mr. CLAPPÉ, Mr. PERRY and the PRESIDENT, and Mr. ARMSTRONG replied.

A hearty vote of thanks was accorded to Mr. ARMSTRONG for his valuable and
interesting paper, and the Institute adjourned till February 19th.

February 19th. 1924.

Ordinary Meeting. Royal Society. Burlington House.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced :
Dr. C. H. Perram. Dr. Geza Roheim. Mr. R. C. Samuels. Mr. R. H. Sennett, and
Mr. F. B. Welch.

Dr. ERNEST JONES read his paper on " Psycho-Analysis and Anthropology."

The paper was discussed by Mr. PERRY. Dr. MACKINTOSH. Mr. GOITEIN.
Dr. SHRUBSALL. Mrs. ISAACS. Miss DURHAM and Mr. FLÜGEL.

A hearty vote of thanks was accorded to Dr. JONES for his paper, and the
Institute adjourned till March 4th.

March 4th. 1924.

Ordinary Meeting. 50. Great Russell Street.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

In the regrettable absence of Sir ARTHUR KEITH, through illness, his paper,
" Neanderthal Man in Malta." with an account of Mr. George Sinclair's " Survey
of the Cave of Ghar Dalam, Malta." illustrated by lantern slides, was read by
Dr. BURKITT, of Sydney.

The paper was discussed by the PRESIDENT. Miss MURRAY. Mr. PEAKE. Mr.
W. LE GROS CLARK and Mr. PARKYN. and Dr. BURKITT replied.

A hearty vote of thanks was accorded to Dr. BURKITT for his kindness in reading
the paper, and the Institute adjourned till March 18th.

March 18th. 1924.

Ordinary Meeting, 50. Great Russell Street.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced :
Dr. Israel Abrahams. Miss Annette S. Baird. Mr. C. T. Currelly. Mr. W. H. Goodchild,
Mr. A. Head. Dr. Petronella van Heerden. Dr. E. H. Hunt. Rev. J. H. Powell.
Dr. Gilbert Slater. Dr. T. C. Tello. Mr. M. M. Thein. and Mr. S. Woodward.

Prof. F. G. PARSONS read his paper on " A Comparison of Cranial Contours." illustrated by lantern slides.

The paper was discussed by Prof. SOLLAS. Dr. GARSON. Dr. HADDON. Miss
DURHAM. Mr. LE GROS CLARK. Mr. PEAKE. Dr. RUSHTON PARKER. Mr. CHILDE.
Dr. BURKITT and the PRESIDENT. and Prof. PARSONS replied.

A hearty vote of thanks was accorded to Prof. PARSONS for his interesting
paper, and the Institute adjourned till April 8th.

April 8th. 1924.

Ordinary Meeting, 50, Great Russell Street.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

Dr. J. H. HUTTON read his paper on "The Use of Stone in the Naga Hills," illustrated by lantern slides.

The paper was discussed by Colonel SHAKESPEAR, Mr. BALFOUR, Mr. SCHWARTZ, Mrs. SCORESBY ROUTLEDGE, Dr. STRONG, Mr. SCORESBY ROUTLEDGE and the PRESIDENT, and Dr. HUTTON replied.

A hearty vote of thanks was accorded to Dr. HUTTON for his valuable and interesting paper, and the Institute adjourned till April 15th.

April 15th. 1924.

Ordinary Meeting, 50, Great Russell Street.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced : Miss C. Borley, Mr. C. C. Fagg, and Mr. Arthur Waley.

Dr. REDCLIFFE SALAMAN read his paper on "An Analysis of Jewish Types," illustrated by lantern slides.

The paper was discussed by the PRESIDENT, Mr. PEAKE, Dr. SHRUBSALL, Dr. RUSHTON PARKER, Mr. HORNBLOWER, and Mr. CURRELLY, and Dr. SALAMAN replied.

A hearty vote of thanks was accorded to Dr. SALAMAN for his valuable and interesting paper, and the Institute adjourned till May 6th.

May 6th. 1924.

Ordinary Meeting, Royal Society, Burlington House.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

Sir DENNISON ROSS, C.I.E., Ph.D., read his paper on "The Origin of the Turk."

The paper was discussed by Mr. PEAKE, Dr. RUSHTON PARKER, Mr. V. GORDON CHILDE, Mrs. HASLUCK, Mr. RAY, Miss DURHAM and the PRESIDENT, and Sir DENNISON ROSS replied.

A hearty vote of thanks was accorded to Sir DENNISON ROSS for his valuable and instructive paper, and the Institute adjourned till May 20th.

May 20th. 1924.

Ordinary Meeting, Royal Society, Burlington House.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced : Mr. W. Kerr Chalmers, Miss V. C. C. Collum, Dr. George Crofts, Mr. W. D. Fitch, Mr. F. T. Grey, Mr. R. Solomon, Mr. F. Stanley Service and Mr. A. C. Tunstall.

Mrs. W. SCORESBY ROUTLEDGE read her paper, "The Austral Islands and Mangareva, S.E. Pacific," illustrated by lantern slides.

The paper was discussed by Mr. FULLER, Mr. BRAUNHOLTZ, Dr. SHRUBSALL, Admiral BOYLE SOMERVILLE and the PRESIDENT, and Mrs. SCORESBY ROUTLEDGE replied.

A hearty vote of thanks was accorded to Mrs. SCORESBY ROUTLEDGE for her interesting paper, and the Institute adjourned till June 3rd.

June 3rd, 1924.

Ordinary Meeting, 50, Great Russell Street.

Prof. C. G. SELIGMAN, President, in the Chair.

The minutes of the last meeting were read and confirmed.

Miss M. E. DURHAM read her paper on "West Balkans : Old Customs connected with Death, Blood Vengeance, etc.," illustrated by lantern slides.

The paper was discussed by Mr. PEAKE, Mr. CHILDE, Mr. FALLAIZE, Mrs. HASLUCK and the PRESIDENT, and Miss DURHAM replied.

A hearty vote of thanks was accorded to Miss DURHAM for her interesting paper, and the Institute adjourned till June 24th.

June 24th, 1924.

Ordinary Meeting, 50, Great Russell Street.

Mr. H. J. E. PEAKE, Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced : Dr. Davidson Black, Mr. K. G. Fenelon, Senhor H. dos Passos-Freitas, Mr. R. Guinness, Mr. G. G. Heye, Mr. W. R. Humphries, Hon. Ivor Montagu, Mr. Oscar Raphael, Mr. D. Talbot Rice, Mr. L. M. Robinson, Mr. F. Turville-Petre, and Miss Alice Werner.

Captain R. S. RATTRAY read his paper on "Rites de Passage in Ashanti," illustrated by lantern slides.

The paper was discussed by Capt. JOYCE, Mrs. AITKEN, Mr. RICHARDS, Miss DURHAM, Miss MURRAY and Mr. PEAKE, and Capt. RATTRAY replied.

A hearty vote of thanks was accorded to Capt. RATTRAY for his valuable and interesting paper, and the Institute adjourned till the autumn.

November 18th, 1924.

Ordinary Meeting, London School of Economics, Houghton Street, W.C. 1.

Prof. C. G. SELIGMAN, President, in the Chair.

The election of the following as Ordinary Fellows of the Institute was announced : Mr. F. J. Bagshawe, Rev. V. A. Demant, Mr. E. E. Evans-Pritchard, Rev. R. H. Goldsworthy, Commander S. P. Herivel, Mr. J. Hedges, Mr. Van Campen Heiben, Captain W. J. Herries, Mr. E. Jacoram, Mr. J. Langdon Davies, Mr. W. Negley, Dr. Elsie Clews Parsons, Prof. R. Ruggles Gates, and Mr. J. F. Stewart.

Captain M. W. HILTON-SIMPSON read his paper on " Native Life in the Algerian Hills," illustrated by the cinematograph film taken by Mr. J. A. HAESELER.

A hearty vote of thanks was accorded to Captain HILTON-SIMPSON for his valuable paper and to Mr. HAESELER for his excellent films, and the Institute adjourned till November 25th.

November 25th, 1924.

Huxley Lecture.

December 9th, 1924.

Ordinary Meeting, 50, Great Russell Street.

Mr. H. J. E. PEAKE, Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. HENRY BALFOUR read his paper on " The Origin of Stencilling in the Fiji Islands," illustrated by lantern slides.

The paper was discussed by Mr. BRAUNHOLTZ, Mr. SCORESBY ROUTLEDGE and Capt. FULLER.

Mr. BALFOUR then read his second paper, " Shell-bead Manufacture and Metal Working in the Naga Hills, Assam," illustrated by lantern slides and specimens.

The paper was discussed by Dr. HUTTON, Mr. RICHARDS, Dr. HILDGURGH, Mr. BRAUNHOLTZ, Capt. FULLER and Mr. PEAKE, and Mr. BALFOUR replied.

A hearty vote of thanks was accorded to Mr. BALFOUR for his interesting papers, and the Institute adjourned till December 16th.

December 16th, 1924.

Ordinary Meeting, 50, Great Russell Street.

Mr. H. J. E. PEAKE, Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

The election of the following as Ordinary Fellows of the Institute was announced : Miss Viola I. Donne, Mr. R. W. Firth, M.A., Dr. Thos. Gann, Miss Isoult F. Grant-Duff, Rev. E. Baxter Riley, Mrs. Scoresby Routledge, Mr. J. S. M. Ward, B.A., Miss Camilla Wedgwood, and Mr. Douglas Wirtz.

Archdeacon H. W. WILLIAMS delivered his lecture on " Some Customs, Beliefs and Traits of the Maori."

The paper was discussed by Mr. PEAKE, Mr. RAY, Mr. BLAGDEN, Mrs. SCORESBY ROUTLEDGE, Mr. PARKYN, Miss PULLEN BURRY and Capt. FULLER, and Archdeacon WILLIAMS replied.

A hearty vote of thanks was accorded to Archdeacon WILLIAMS for his helpful and interesting lecture, and the Institute adjourned till January 6th, 1925.

Further Note on the "Paccha" of Ancient Peru.

By T. A. JOYCE, M.A.

IN 1922 I published in the *Journal of the Royal Anthropological Institute*, Vol. LII, p. 141, a short paper on "The 'Paccha' of Ancient Peru." Two of these peculiar wooden utensils, with double zigzag channels, had been exhibited in the exhibition of Indigenous American Art, organized by the Burlington Fine Arts Club in 1920, and had proved a puzzle even to the experts. I was so fortunate as to alight upon a passage and an illustration in Frézier's *Relation du Voyage de la Mer du Sud*, which explained their use as utensils by means of which Chicha (maize-beer) was served directly into the mouths of guests at a feast. Frézier gives the name of this peculiar appliance as "paquecha," which I suggested was the French orthography of the word "paccha," the meaning of which is given in Tschudi's Kechua dictionary as "(1) Subst. *das Bächlein, die Quelle; arroyo, chorro de agua, fuente*. (2) Verb. *fließen (vom Wasser), tropfen: correr el agua, gotear*." Frézier observed the use of the appliance at a native feast at Talcahuano in Chile, but the name is evidently Peruvian, and the two specimens exhibited at the Burlington Fine Arts Club were undoubtedly Peruvian of the Inca period. So far it seemed fairly clear that the utensil was Peruvian in origin.

Since writing the paper quoted above I have come across two additional points of information which it is perhaps worth while placing on record.

A *Vocabulario de la Lengua Aymara*, by the Jesuit Ludovico Bertonio, was published in 1602.¹ Bertonio gives the meaning of the word *paccha* (which he spells *phakhcha*) as "Fuente que hecha el agua per algun cano." But he gives a second meaning: "Es tambien un instrumento de madera con que beven chicha per passatiempo, corriendo encañada." This passage not only corroborates Frézier's account, but proves that the same utensil was in use among the inhabitants of Juli, on the west of Lake Titicaca in Bolivia, from whom Bertonio collected his *Vocabulario*. Sir Clements Markham has shown² that the inhabitants of Juli were, in the main, *mitimaes*, or colonists who had been transferred from the Valley of the Apurimac, in Kechua territory, to Juli by orders of the great Inca Tupac Yupanqui. Consequently Bertonio's *Vocabulario* consists, for the most part, of Kechua terms, together with a certain number of words borrowed by the settlers from the original inhabitants. Tupac Yupanqui, we know, made expeditions into Chile, and carried the boundaries of the empire to the River Maule. Probably it was in his time that the *paccha* was introduced into Chile by colonists in the same way as it had reached the western shore of Titicaca.

The second point is more interesting. When the two *paccha* appeared at the exhibition of the Burlington Fine Arts Club they were the first specimens of this type of the appliance which I had seen, and I was all the more interested because each of them showed an ornamental motive which, further, was new to my experience of Peruvian art. This motive is the figure of some insect-like creature, with large transversely-banded abdomen, and a number of legs varying from six to four. I reproduce the two illustrations which show the creature (Figs. 1 and 2).

The fact that both the utensil and the design were new to me, and that the design was common to both the specimens, was interesting, and I consulted the experts in the Entomological Department of the Natural History Museum. At the time

¹ Republished by Julio Platzmann, Leipzig, 1879, Teubner.

² *The Incas of Peru*, London, 1911, Smith, Elder & Co., pp. 314-315

this line of enquiry did not seem to lead anywhere: the verdict was that the "insect" was most probably some variety of Argioid spider, but that the animal had been too far conventionalized to be identified with accuracy, and I did not include the information in my paper.

Tschudi (Vienna, 1853), in his dictionary, gives, as the Kechua words for spider, "*Ura*, Araña. Todo genero de insecto," and "*Apasanca*, Una especie de Araña." Middendorf (Leipzig, 1890) gives "*Ura*, La Araña: *Apasanca*, ocl. *Apasanca Ura*, Araña grande: and *Cusi-cusi Ura*, Araña no venenosa." Bertonio, in his Aymara dictionary, quoted above, gives *Ura-ura* as the equivalent of "Araña ponçosa," and *Cusi-cusi* as the equivalent of "Araña que haze la tela." The name given to the poisonous spider by the people of the Collao (the southern highland province of

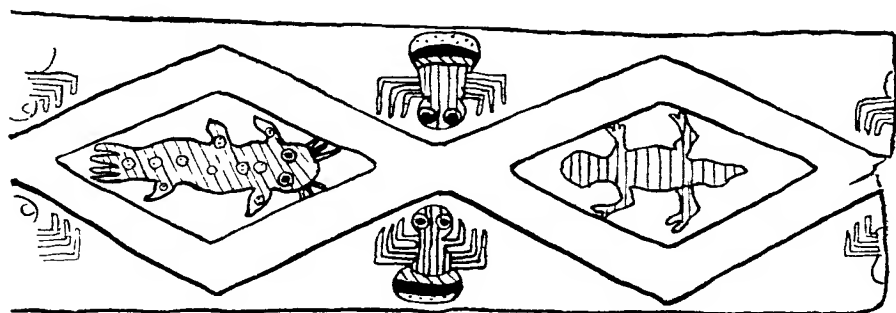


FIG. 1.

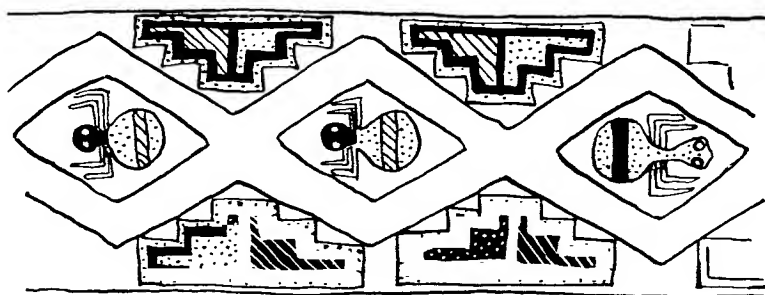


FIG. 2.

the Inca empire), amongst whom the Aymara had settled as enforced colonists, he quotes as *Tapu-tapu*.

Torres Rubio in his *Arte y Vocabulario de la Lengua Quechua* (Lima, 1754) gives *Ura* as the generic term for "Araña": *Apasanca* for "Araña grande": and *Cusi-cusi* for "Araña que hila." But he appends to his dictionary a "Vocabulario de la Lengua Chinchaisuyo . . . que compuso y añadió al Antiguo el Padre Juan de Figueredo." Chinchaisuyo was the name given by the early Inca tribe to the region inhabited by the people to the immediate north of the valley of Cuzco. In this "Vocabulario" the word for spider is given as *paccha*.

In the light of this information the device of the spider as applied to the utensil immediately becomes significant. The creature, in the Chinchaisuyo dialect, is the homonym of the appliance, and this fact gives rise to two further suggestions.

The first of these is that the use of the *paccha* originated in the Chinchaisuyo district. I am not convinced that this is quite a fair assumption, because it involves

certain other questions. If the zigzag channels carved in the solid rock at Kenkko at Cuzco are, in fact, ceremonial *paccha*, by means of which offerings of *chicha* were made to the dead, then we must suppose not only that these carvings are pre-Inca, but that the Chinchaisuyo dialect prevailed in the Cuzco valley in pre-Inca times. Of course, neither of these suppositions is impossible, but the lack of any evidence in support renders them hazardous.

With regard to the second point, we are on surer ground. It is quite obvious that in this spider design we have an embryo hieroglyph. The question of the existence of any form of writing in pre-Spanish South America has been often debated, but it is quite certain that no form of script existed at the time of the Conquest. The sole evidence that a script had at some time existed in Peru is the unsupported statement of Montesinos that in pre-Inca times some form of writing was known, but abolished by one of the early rulers of the highlands. As regards this statement, the evidence of archaeology is absolutely negative. Hence the interest of the two specimens under discussion. Here we have two highly specialized utensils, each decorated with an unusual design, in a technique which is manifestly of the late Inca period. That design is the homonym of the utensil, and it is clear that the Peruvians were just entering the path which leads to the elaboration of a phonetic script when the advent of the Spaniards destroyed their ancient culture.

Confirmation of the meaning of the word *paccha* = spider is supplied by J. de Arriaga in his *Extirpacion de la Idolatria del Peru* (Lima, 1621). In his description of the various methods of divination employed by the natives, he mentions a class of sooth-sayers called *Pachacutic*, *Pachariac* (? *Pachariuae*) and *Pachacac* (? *Pachacac*), who took omens by placing a spider, *paccha*, on a cloth, and teasing it with a stick until some of the legs broke off. The answer appears to have depended upon the question which legs were detached from the body of the spider at the end of the process.

Arriaga collected his information apparently from the district around Lima, and therefore from part of the Chinchaisuyo region, consequently his remarks supply confirmation of the fact that the word *paccha* denoted spider, and also was a term in use in the Chinchaisuyo.

Sir Clements Markham in his *Language of the Incas of Peru* (London, 1907) gives in his Kechua-English vocabulary the four words quoted above from Arriaga with their meanings. But in the English-Kechua section he records only the terms *Apsatana* and *Casi-casi* under the heading "spider." The points which I wish to enforce are these:—

(1) That the term *paccha* denoting "spider" is not Kechua, but belongs to the Chinchaisuyo dialect.

(2) That the spider design, unknown elsewhere, but appearing upon two highly specialized utensils, designed for the ceremonial serving of drink, also called *paccha*, may be an indication that the appliance itself is of Chinchaisuyo origin. It is rather significant that the pottery *paccha* of the coast never bear the figure of a spider, the animal not being homonymous with the utensil in that region.

(3) That the use of a design peculiar to the utensil of which it is the homonym provides the nearest approach to any form of hieroglyphic writing at present discovered in South America.

Finally, an interesting illustration of the general levelling and interchange of local cultures, which took place under the Inca régime, is afforded by the fact that the function of this peculiar appliance, as well as its name, has been established by Frézier's observations made at Talcahuano in Chile, to the south of the River Maule, which formed the boundary of established Inca rule in pre-Spanish times.

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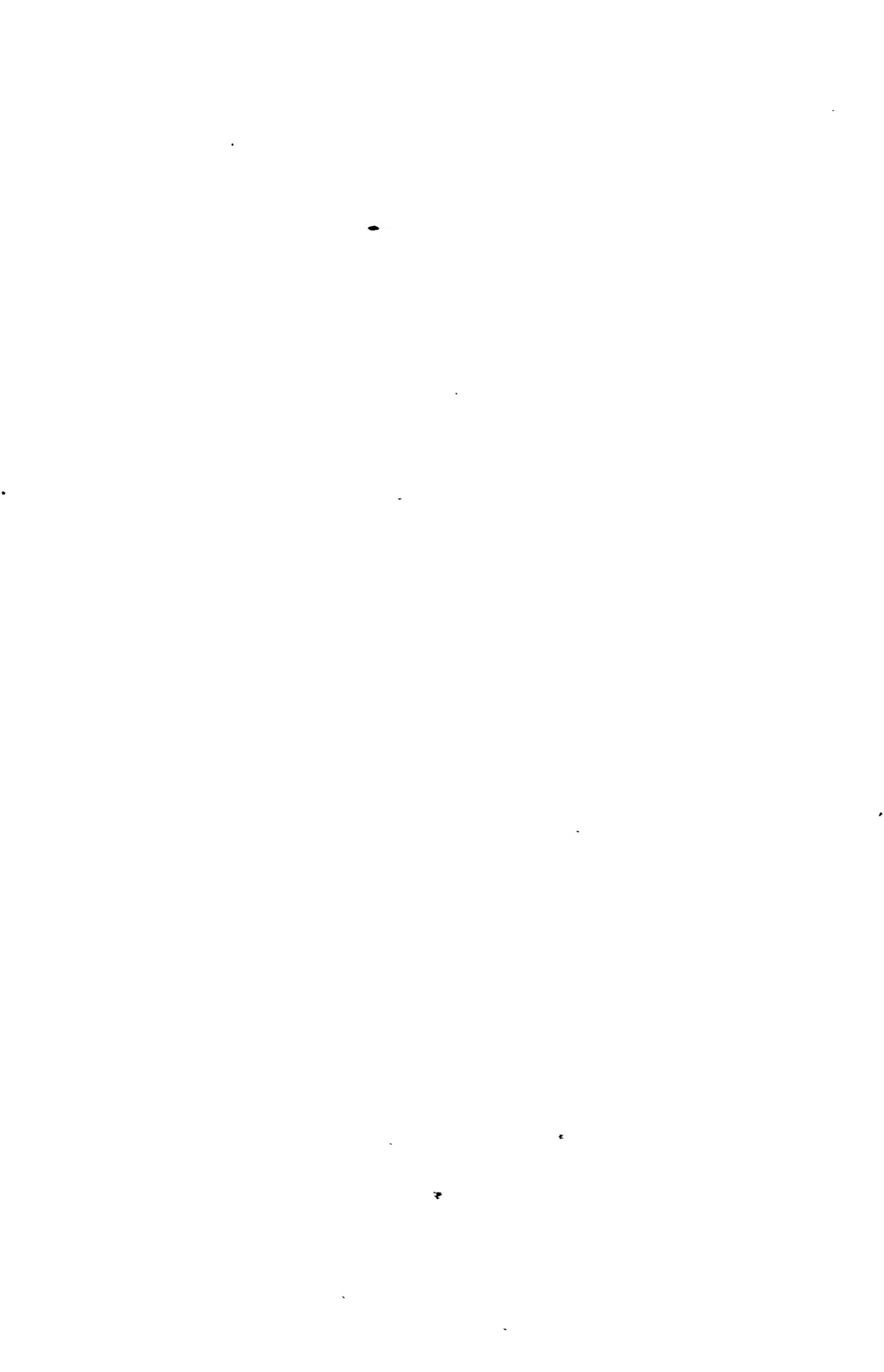
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